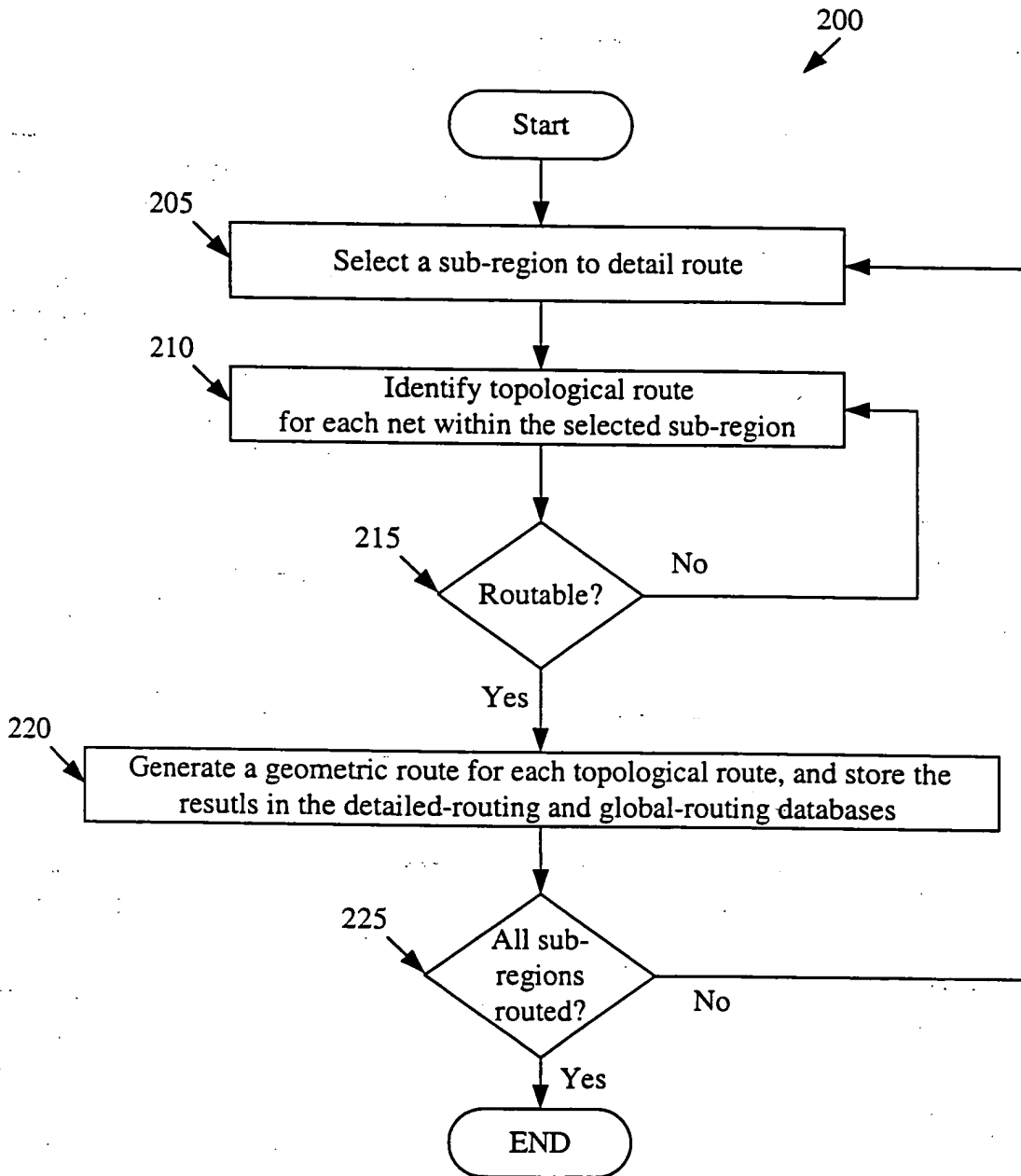


Figure 1



**Figure 2**

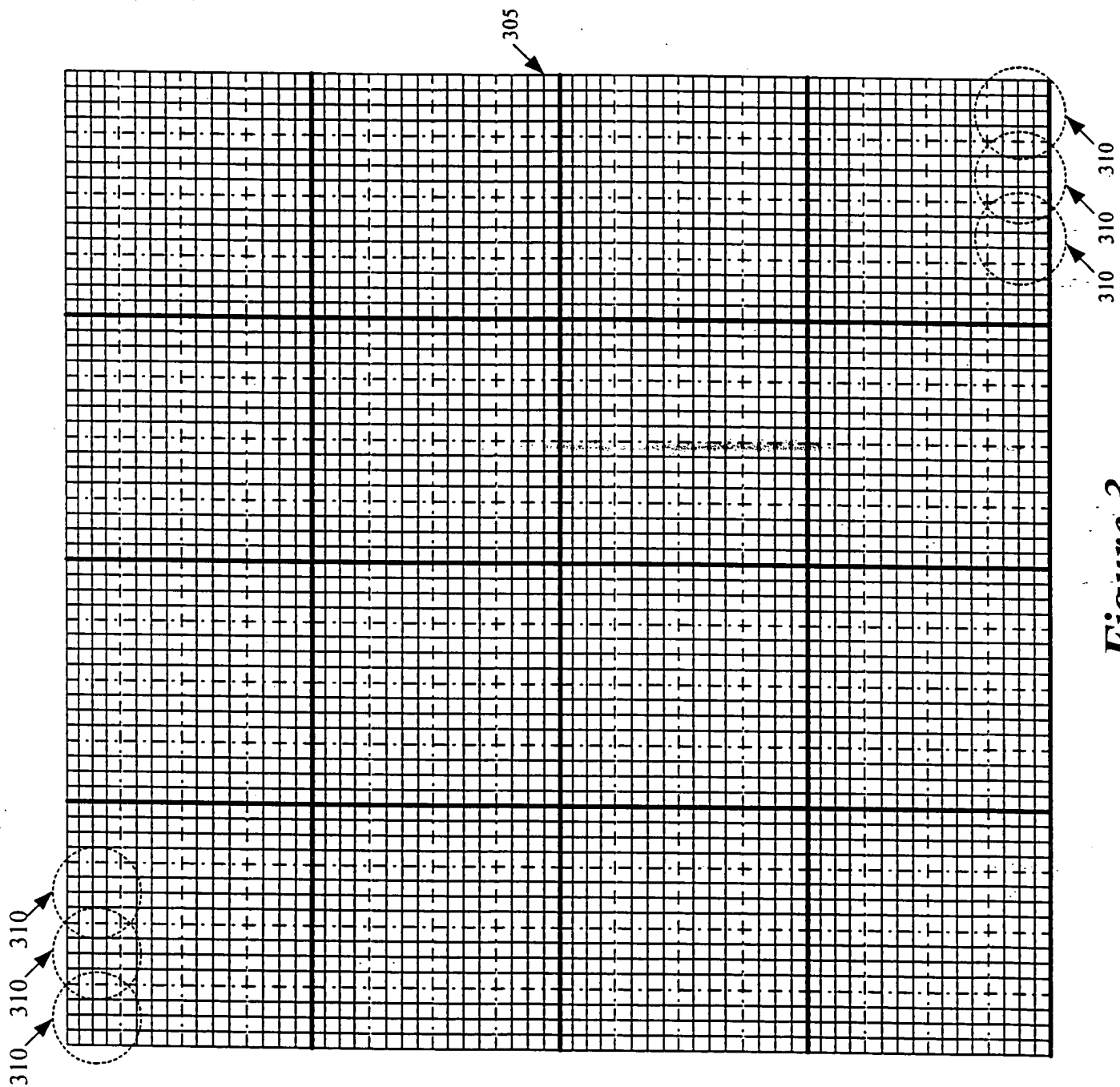


Figure 3

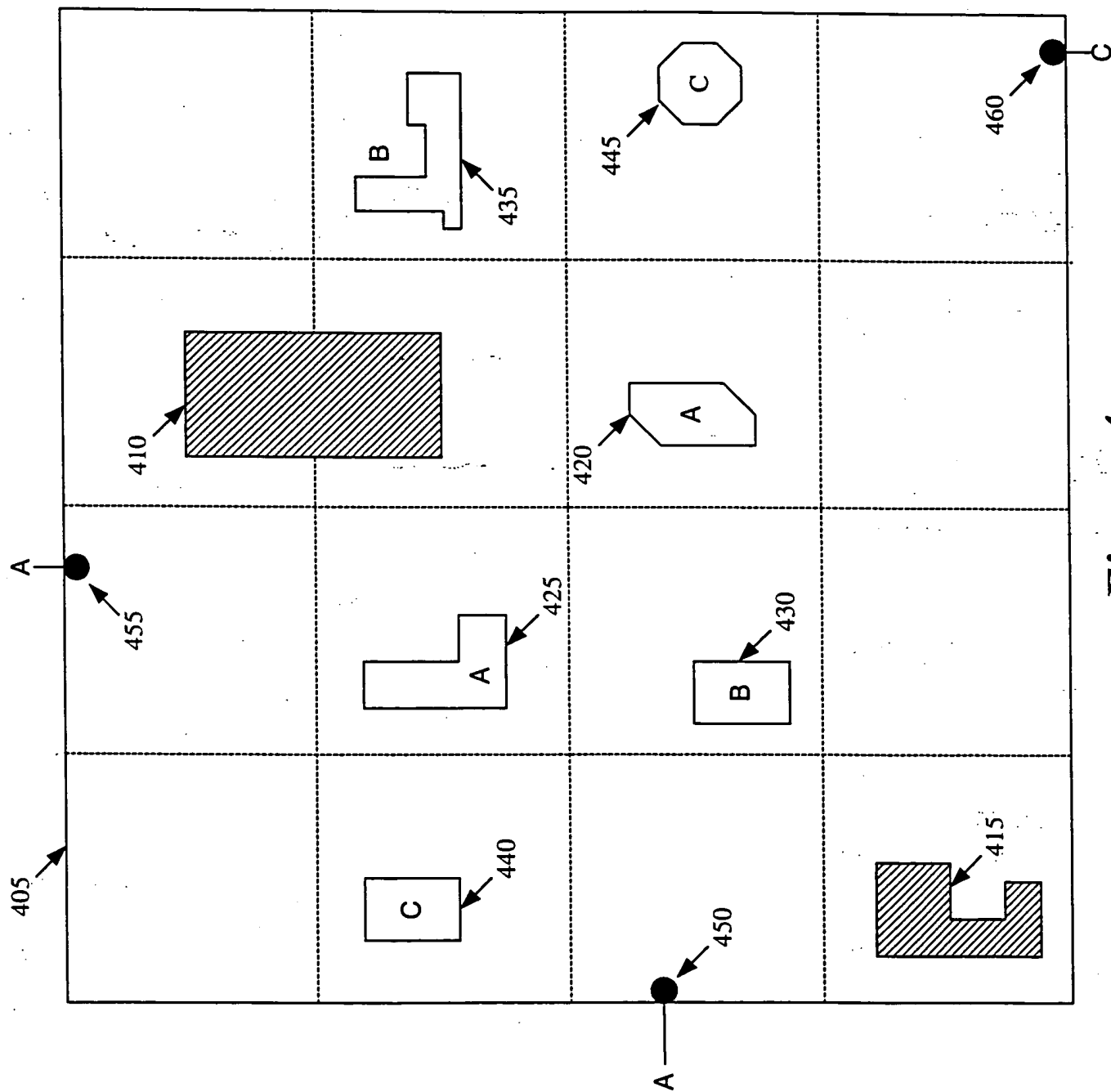
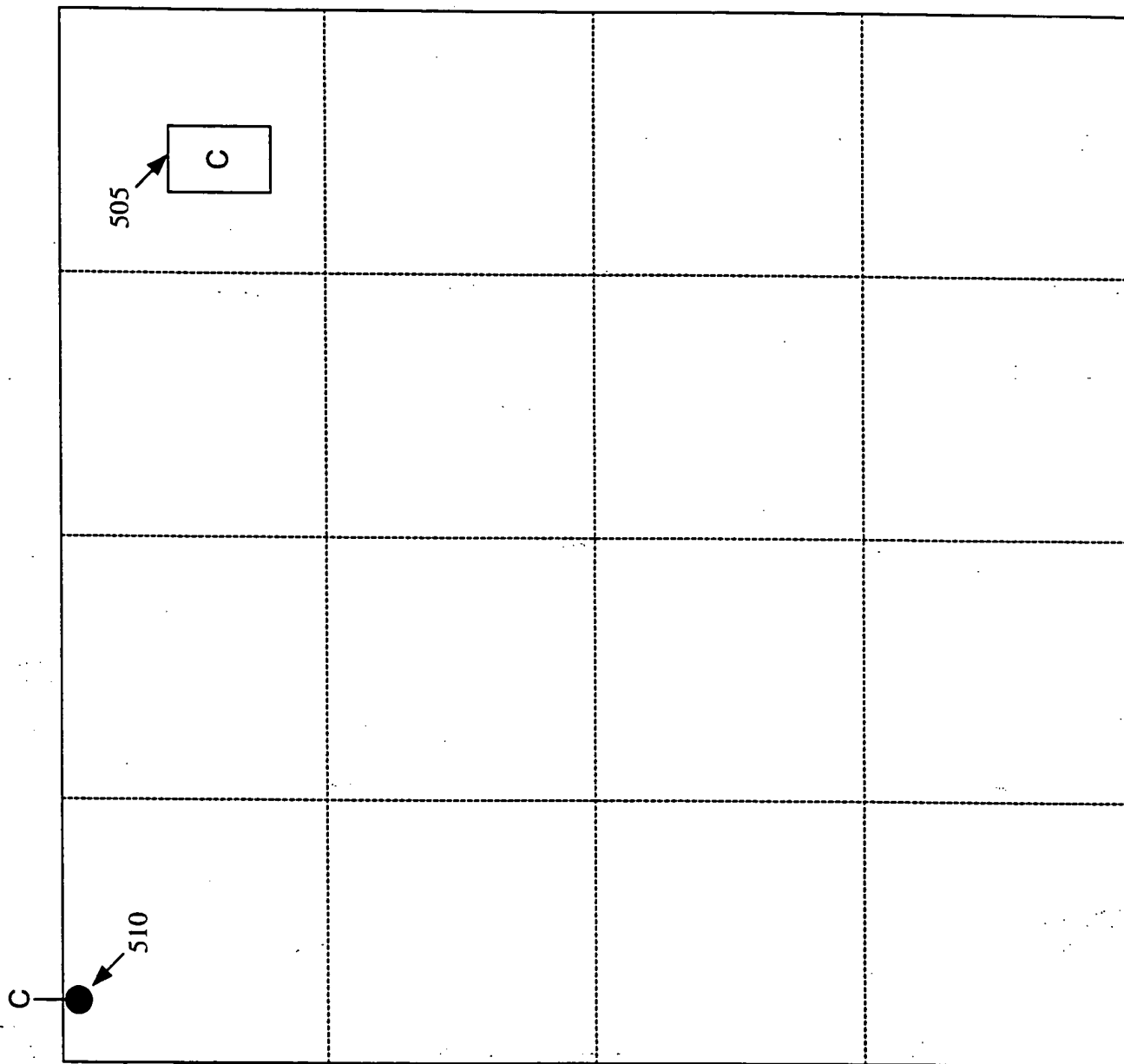


Figure 4



*Figure 5*

```

-List of Geometries
  --Each Geometry including a sequence of points & layer assignment
-Bounding box of the region
-Array of layer properties
  --Minimum wire size
  --Minimum spacing
  --Via sizes
  --Cost/Unit
-Netlist specifying a number of nets
  --Each net specifying a set of pins
  --Each pin specifying a set of ports
  --Each port specifying a set of geometries

```

*Figure 6*

```

-List of Geometries
  --Each Geometry including a sequence of points & layer assignment
  --List of connection nodes inside each pin geometry
-Bounding box of the region
-Array of layer properties
  --Minimum wire size
  --Minimum spacing
  --Via sizes
  --Cost/Unit
-Netlist specifying a number of nets
  --Each net specifying a set of pins
  --Each pin specifying a set of ports
  --Each port specifying a set of geometries
-For each layer, a graph specifying
  --Nodes
  --Edges
  --Faces

```

*Figure 7*

Face
<ul style="list-style-type: none"><li>-Reference to 3 edges</li><li>-Reference to 3 nodes</li><li>-Up to two references for up to two face item</li></ul>

800

Edge
<ul style="list-style-type: none"><li>-Two references for up to two faces of the edge</li><li>-Capacity</li><li>-Flow</li><li>-Constrained</li><li>-Linked list of items on the edge starting with one of the edge's nodes and ending with its other node</li></ul>

900

Figure 8

Figure 9

Node
<ul style="list-style-type: none"> <li>-Net Identifier</li> <li>-One or more planar-path references to adjacent topological items in the same planar path</li> <li>-A pair of via-path references to up and down topological via items</li> <li>-A references to list of edges connected to the node</li> <li>-For each edge, an edge reference to the next or previous topological item on the edge</li> <li>-A reference to the geometry of the node</li> <li>-Vertex number identifying the vertex of the geometry</li> <li>-Location of the node</li> </ul>

1000

*Figure 10*

Edge Item
<ul style="list-style-type: none"> <li>-Reference to its edge</li> <li>-Net Identifier</li> <li>-A pair of planar-path references to adjacent topological items in the same planar path</li> <li>-A pair of edge references to the next and previous topological item on the edge</li> </ul>

1100

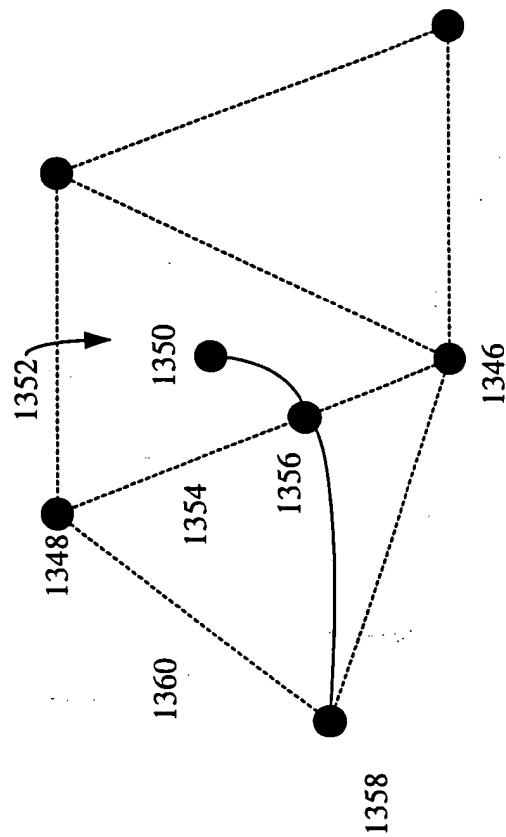
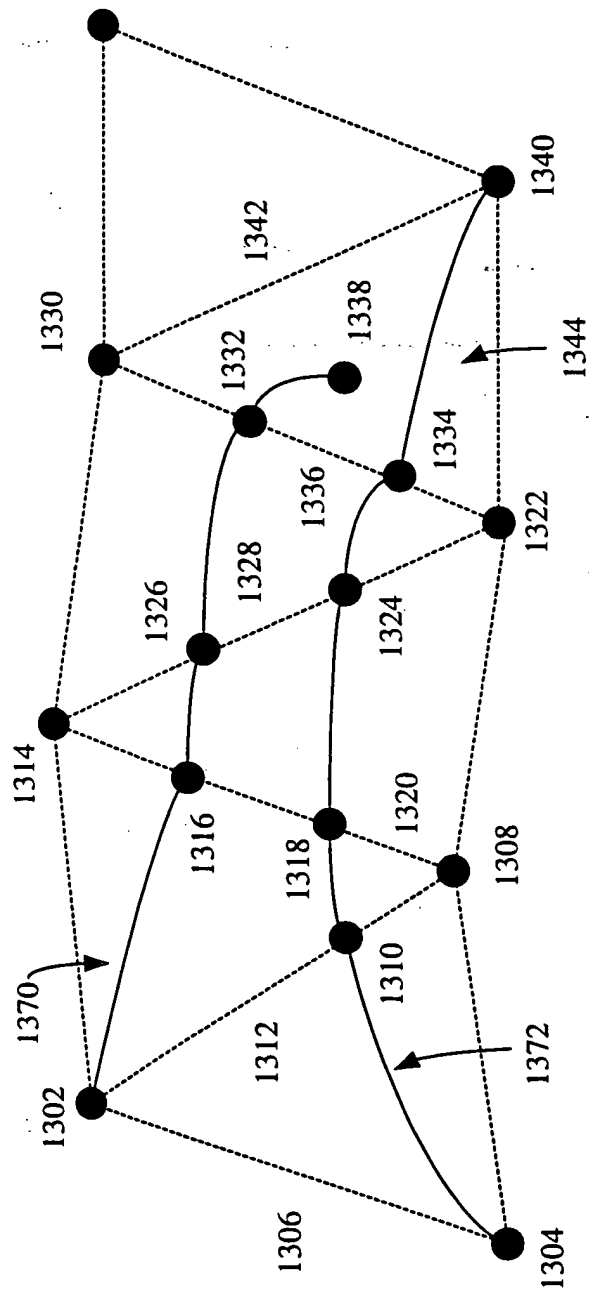
Face Item
<ul style="list-style-type: none"> <li>-Reference to its face</li> <li>-Net Identifier</li> <li>-Up to 3 planar-path references for adjacent topological items in the same planar path</li> <li>-A pair of via-path references for up and down topological via items</li> <li>-Bounding polygon that defines legal face item locations</li> <li>-Constraining Points and Distances</li> </ul>

1200

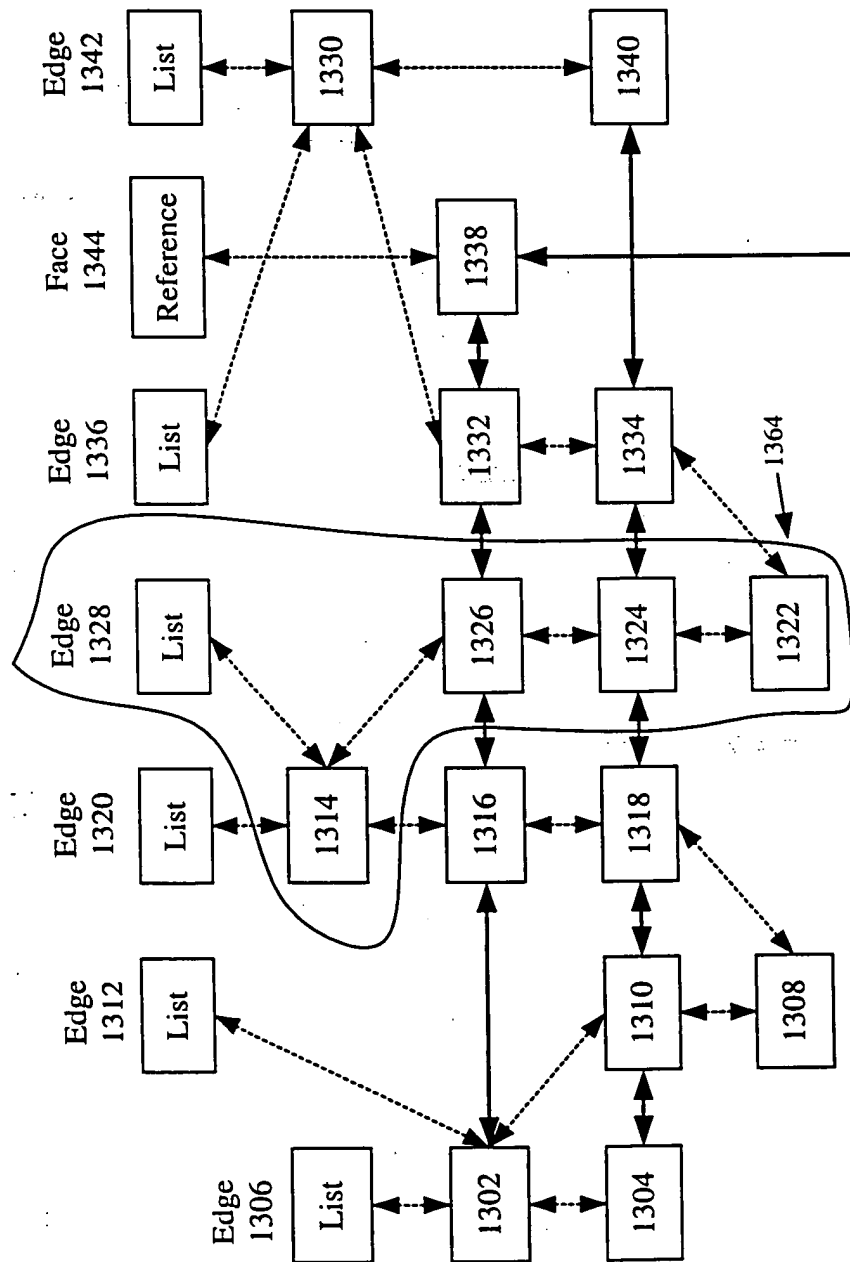
*Figure 11*

*Figure 12*

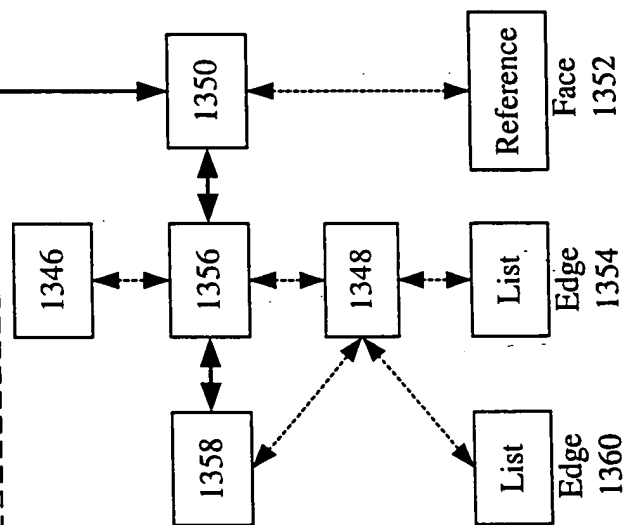




**Figure 13**

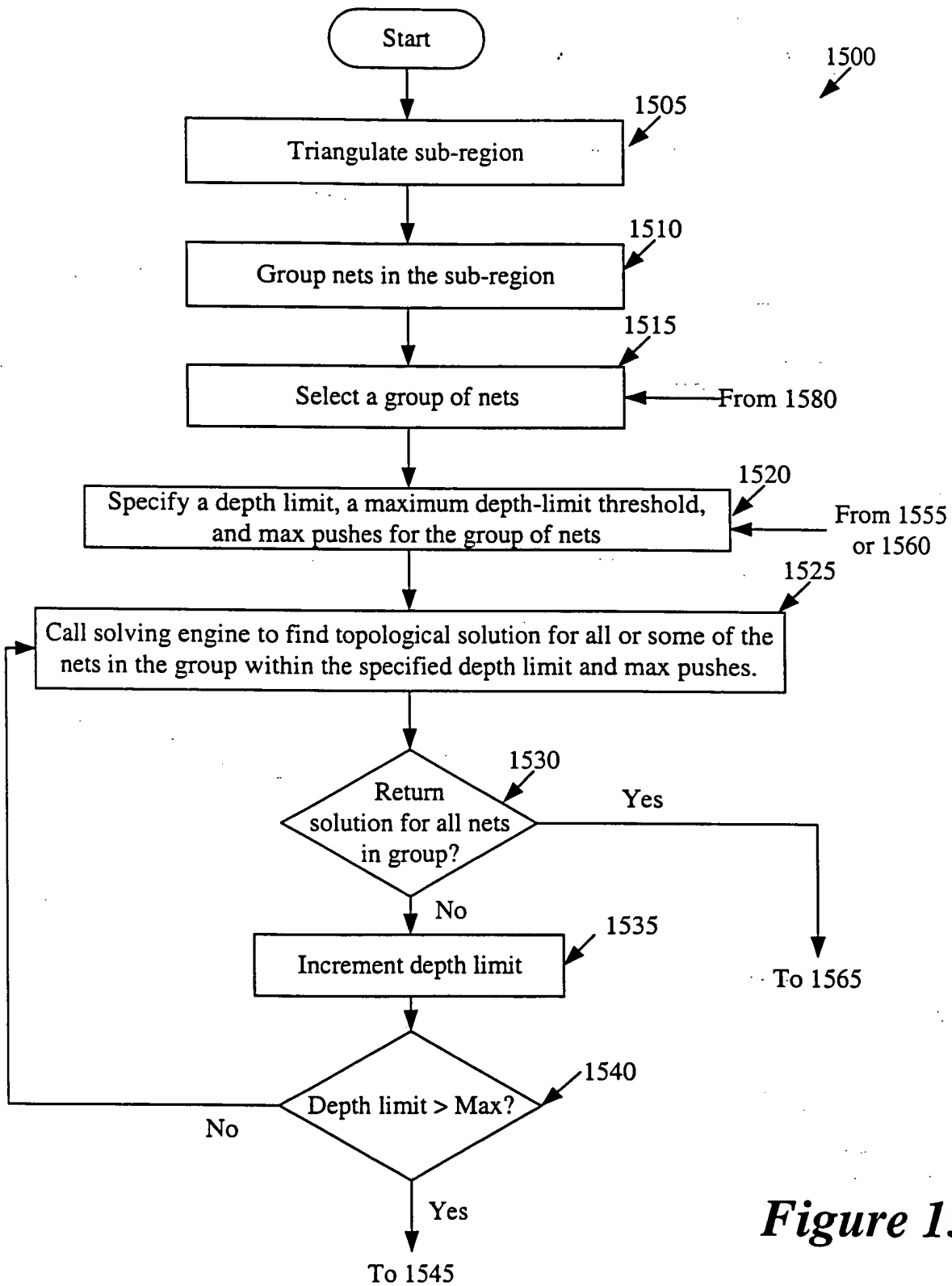


Layer 2



Layer 3

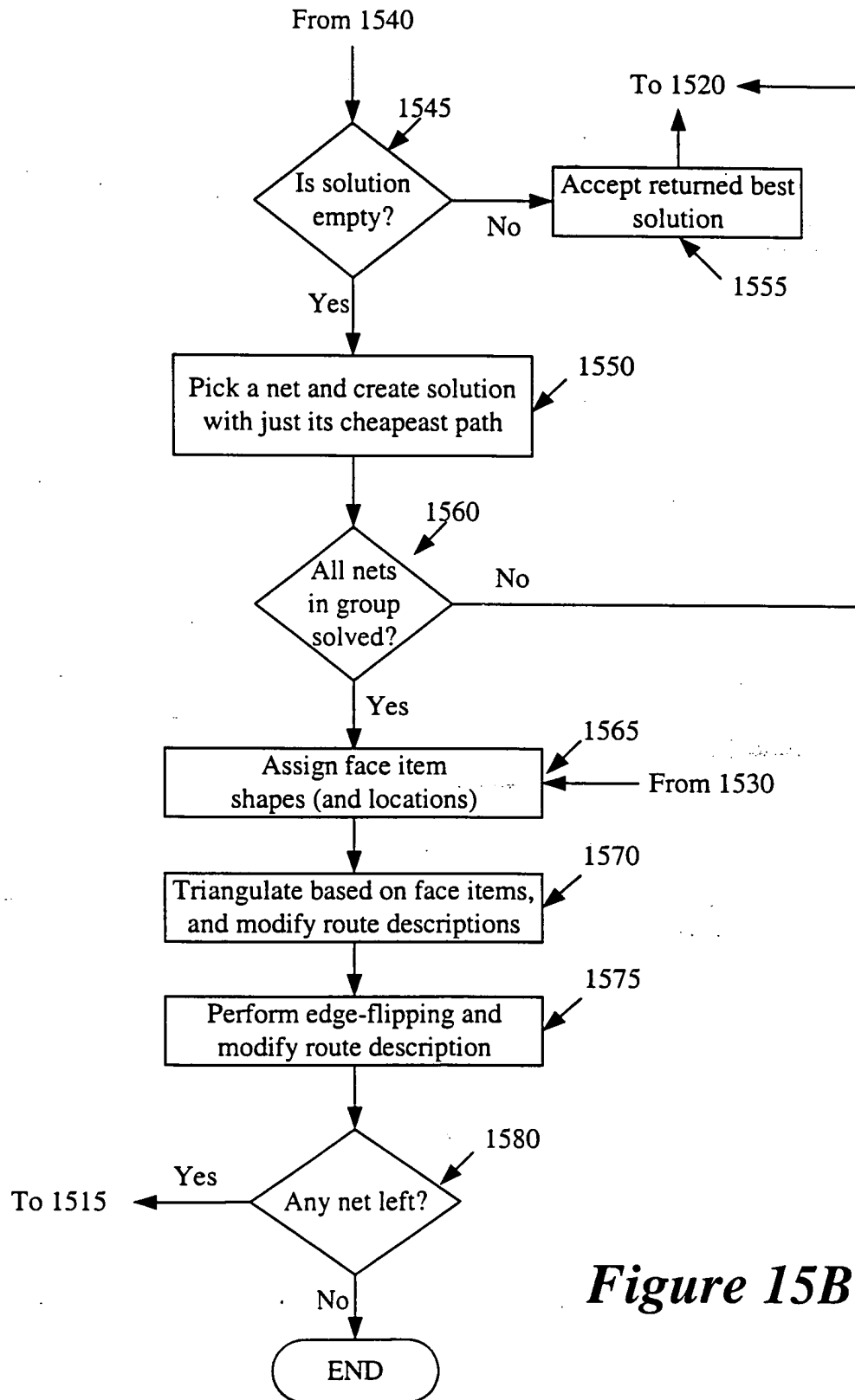
Figure 14



**Figure 15A**

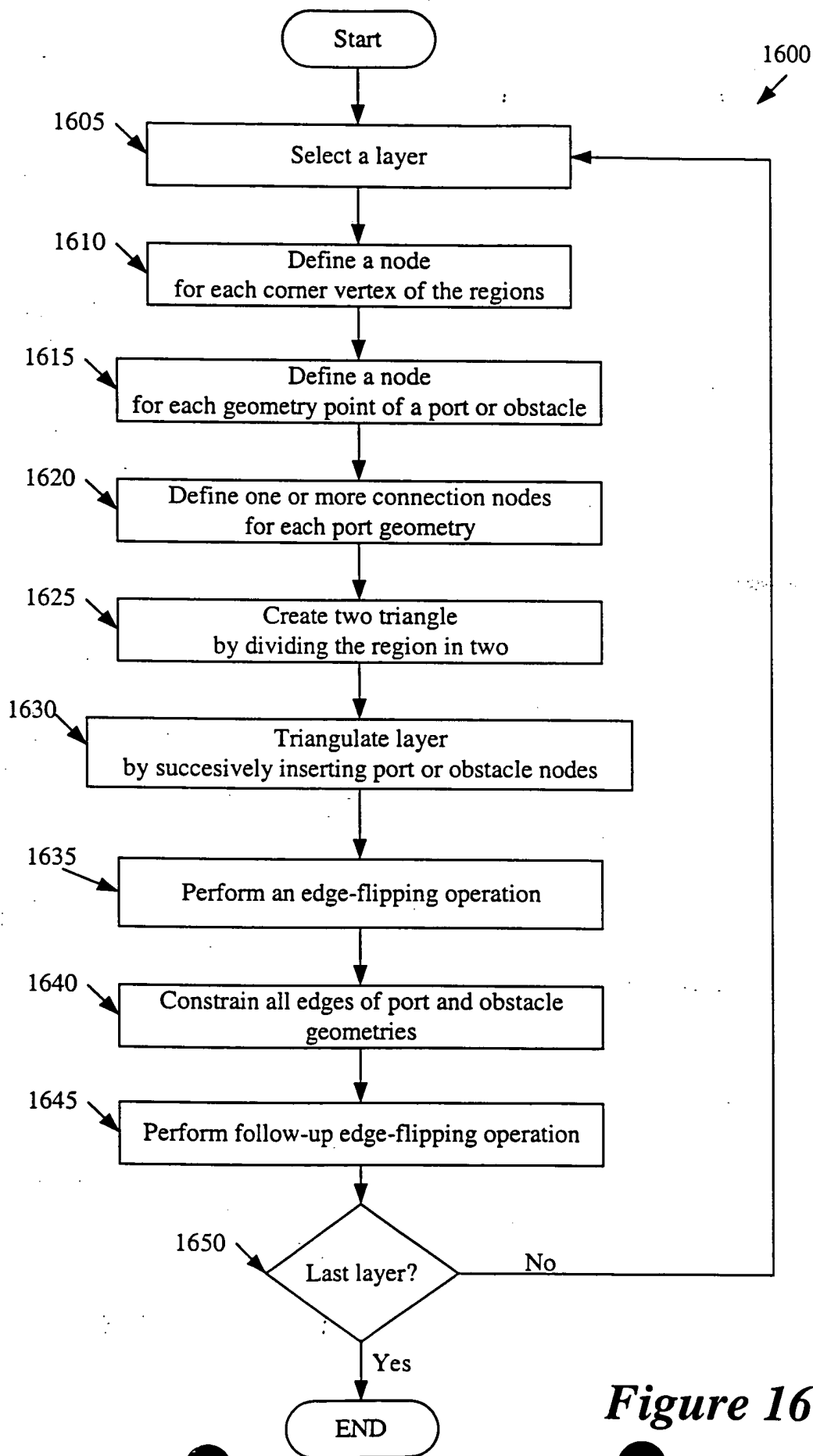
**Figure 15:** Figure 15A  
Figure 15B

10066047-013102



**Figure 15B**

10066047.013102



**Figure 16**

207E7D 2409900T

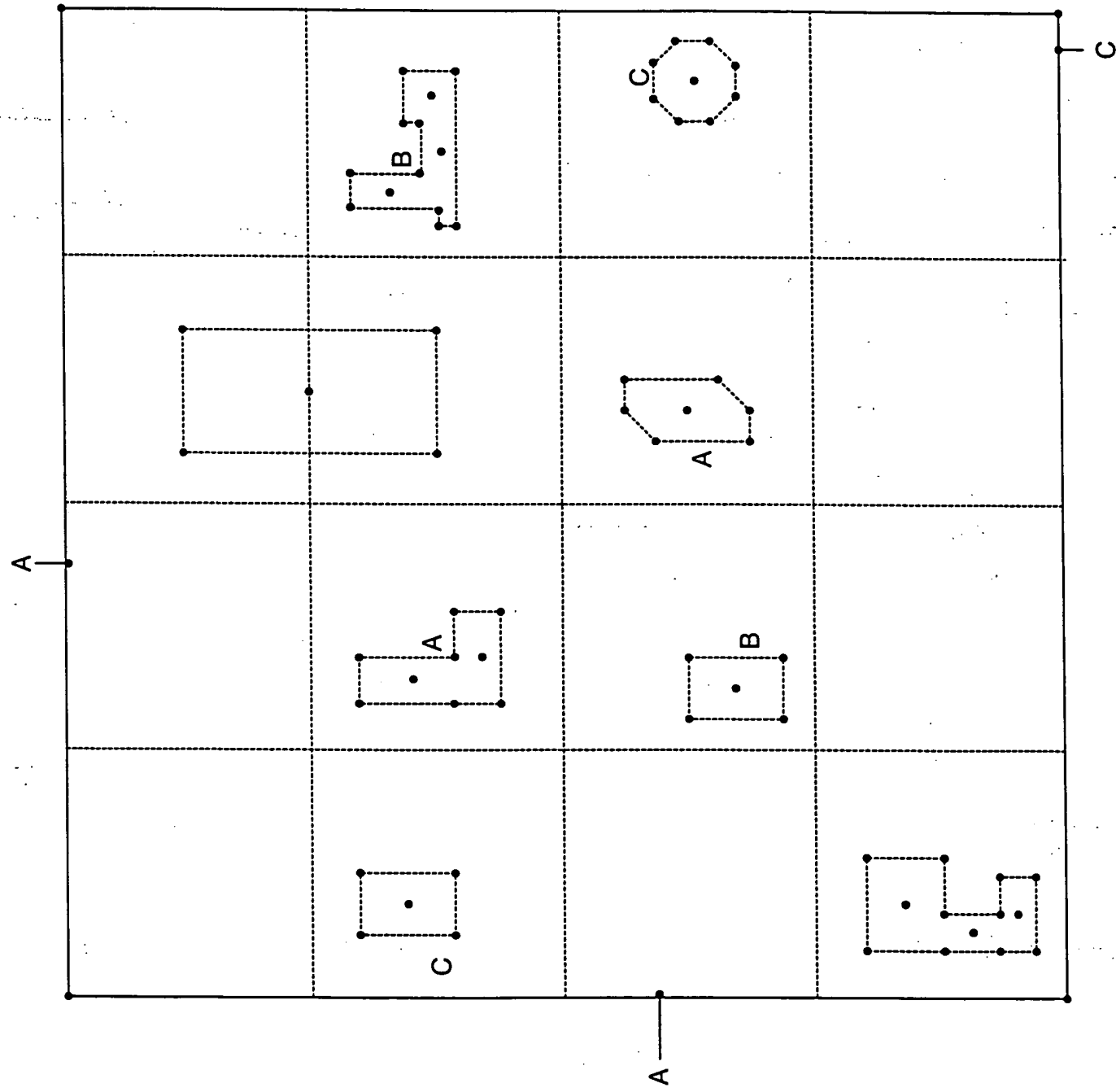


Figure 17

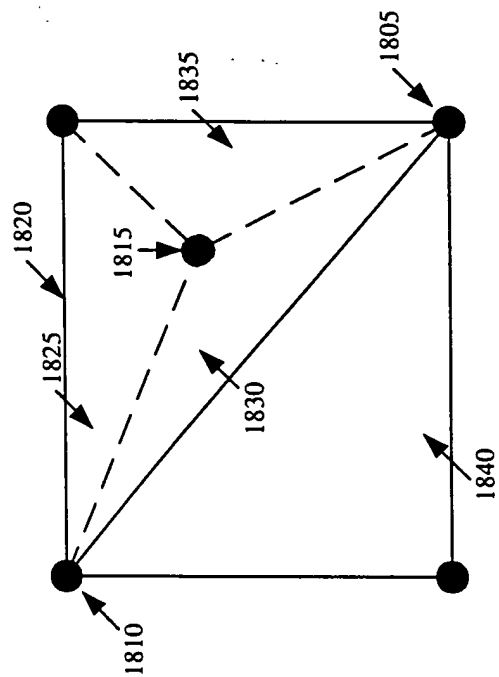


Figure 18

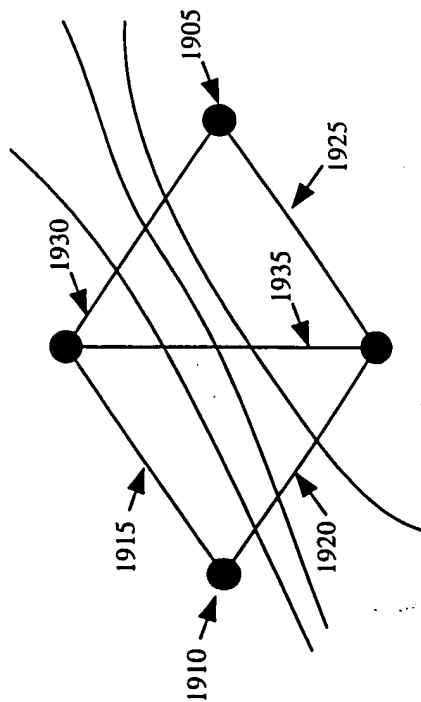


Figure 19

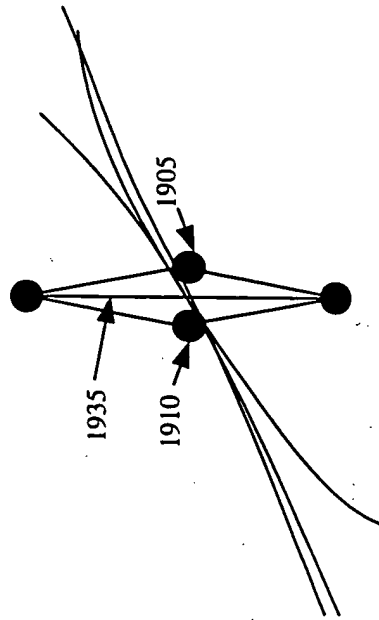


Figure 20

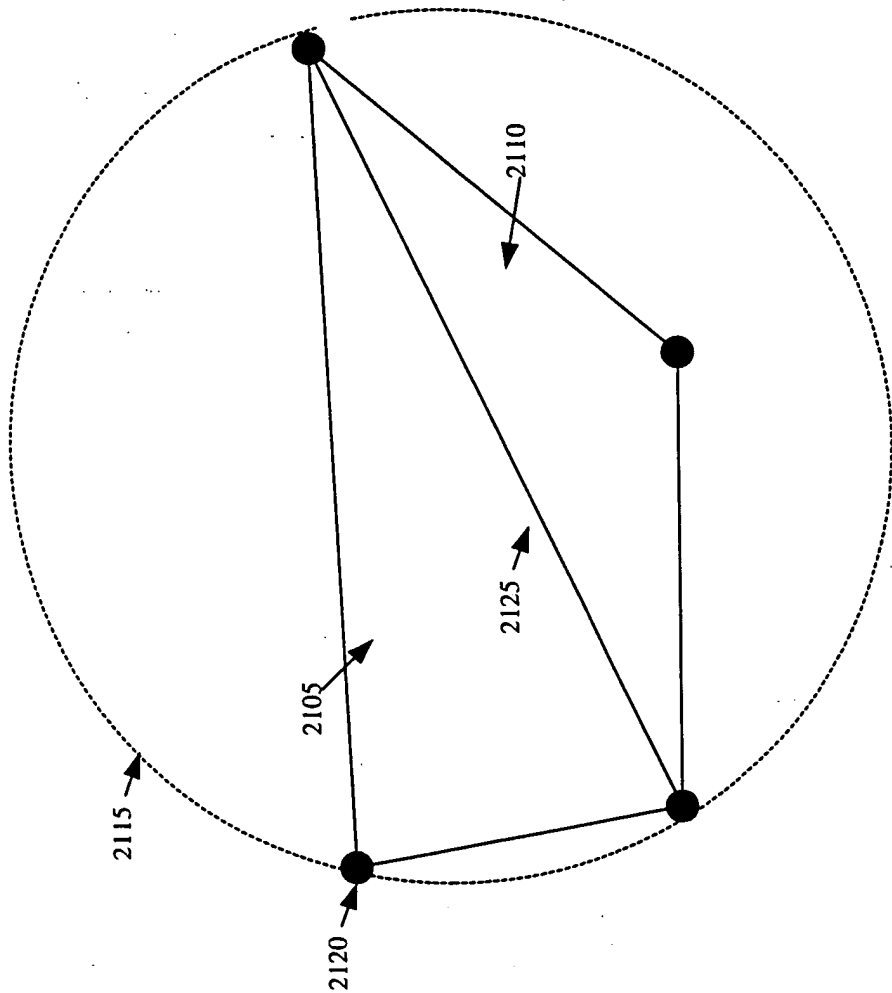


Figure 21

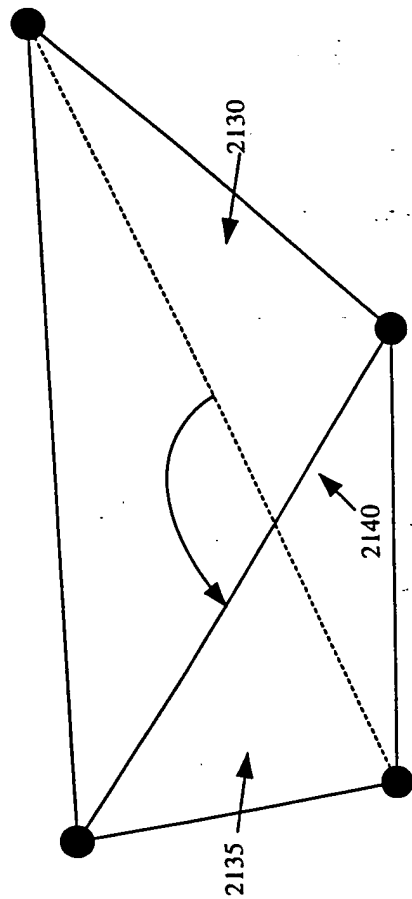


Figure 22



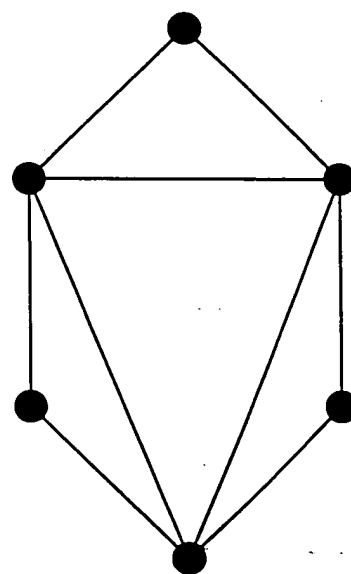
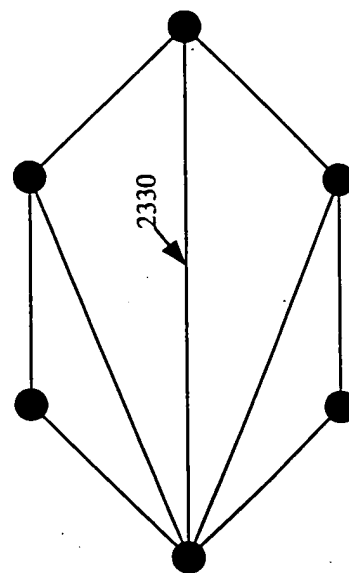
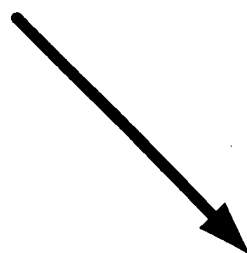
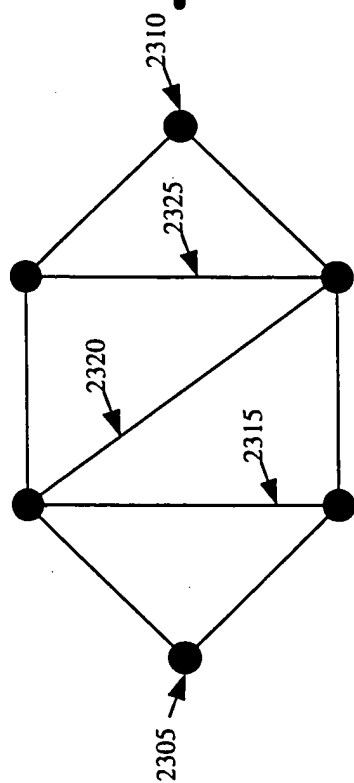
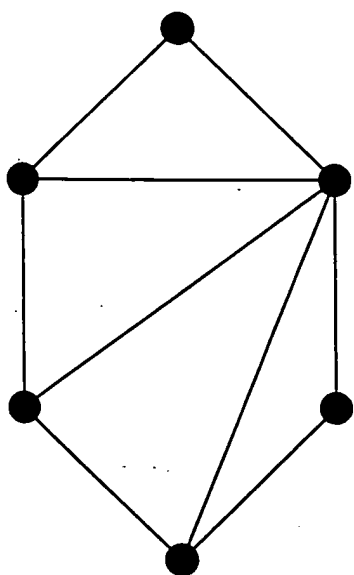


Figure 23

207EATC 2409900T

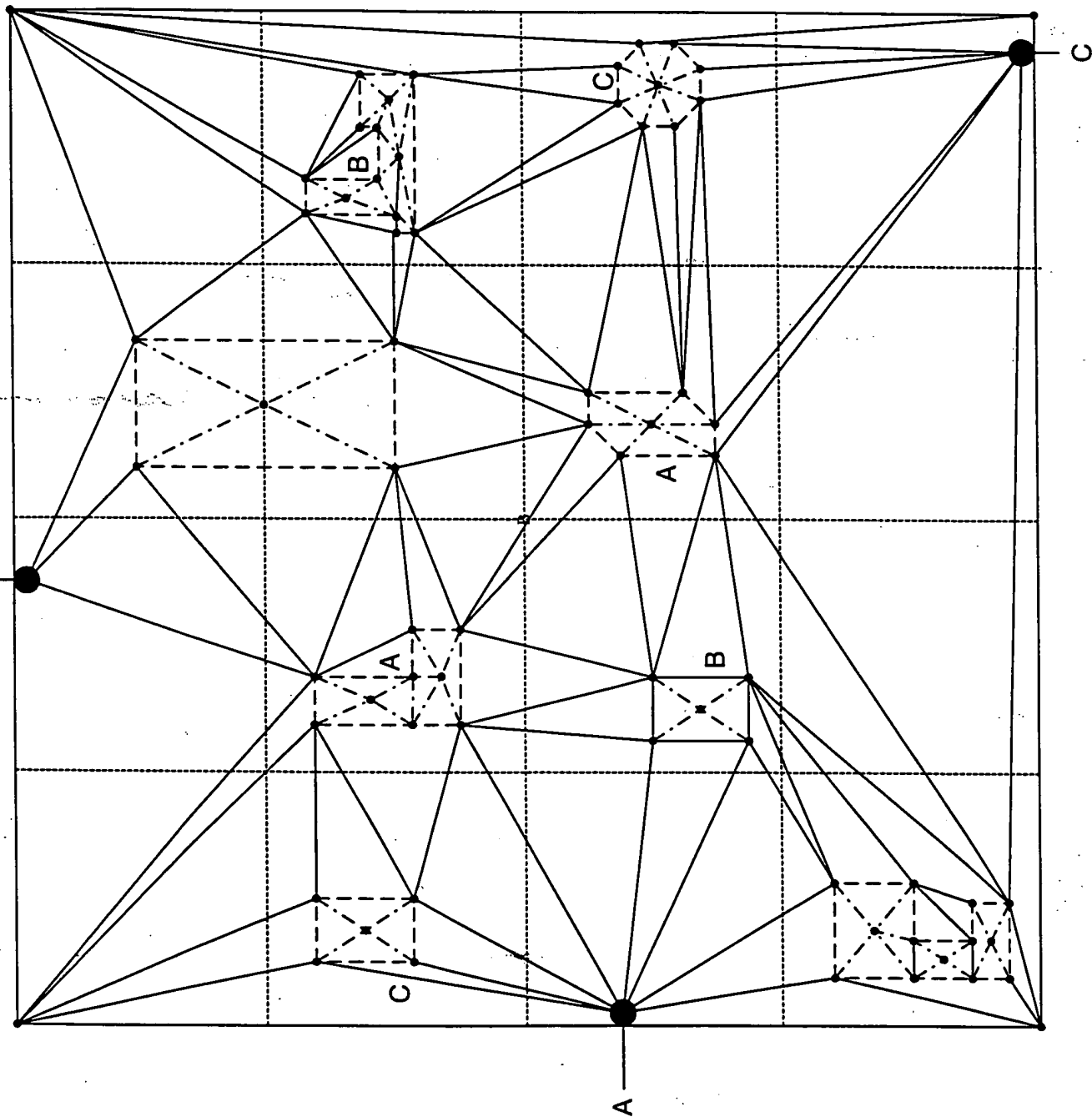
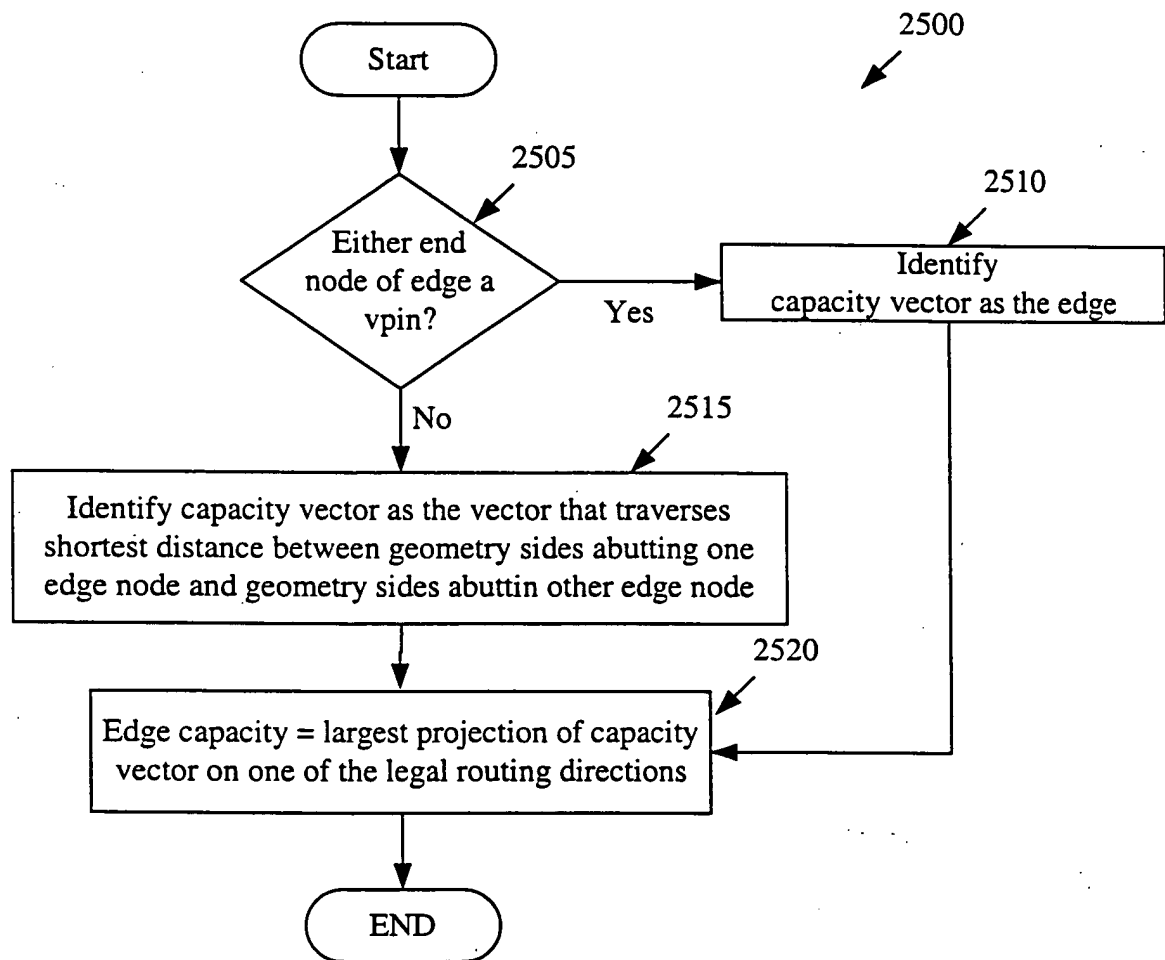


Figure 24



**Figure 25**

**Figure 26**

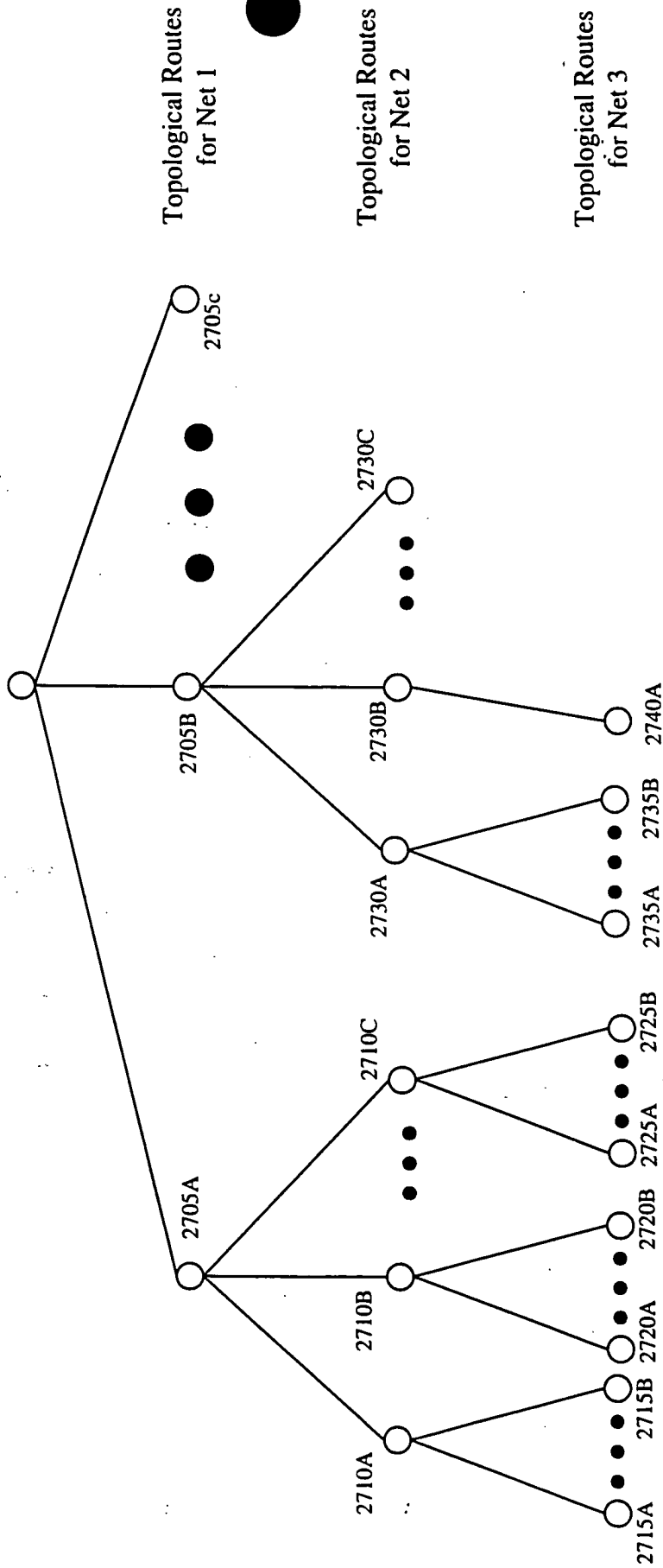
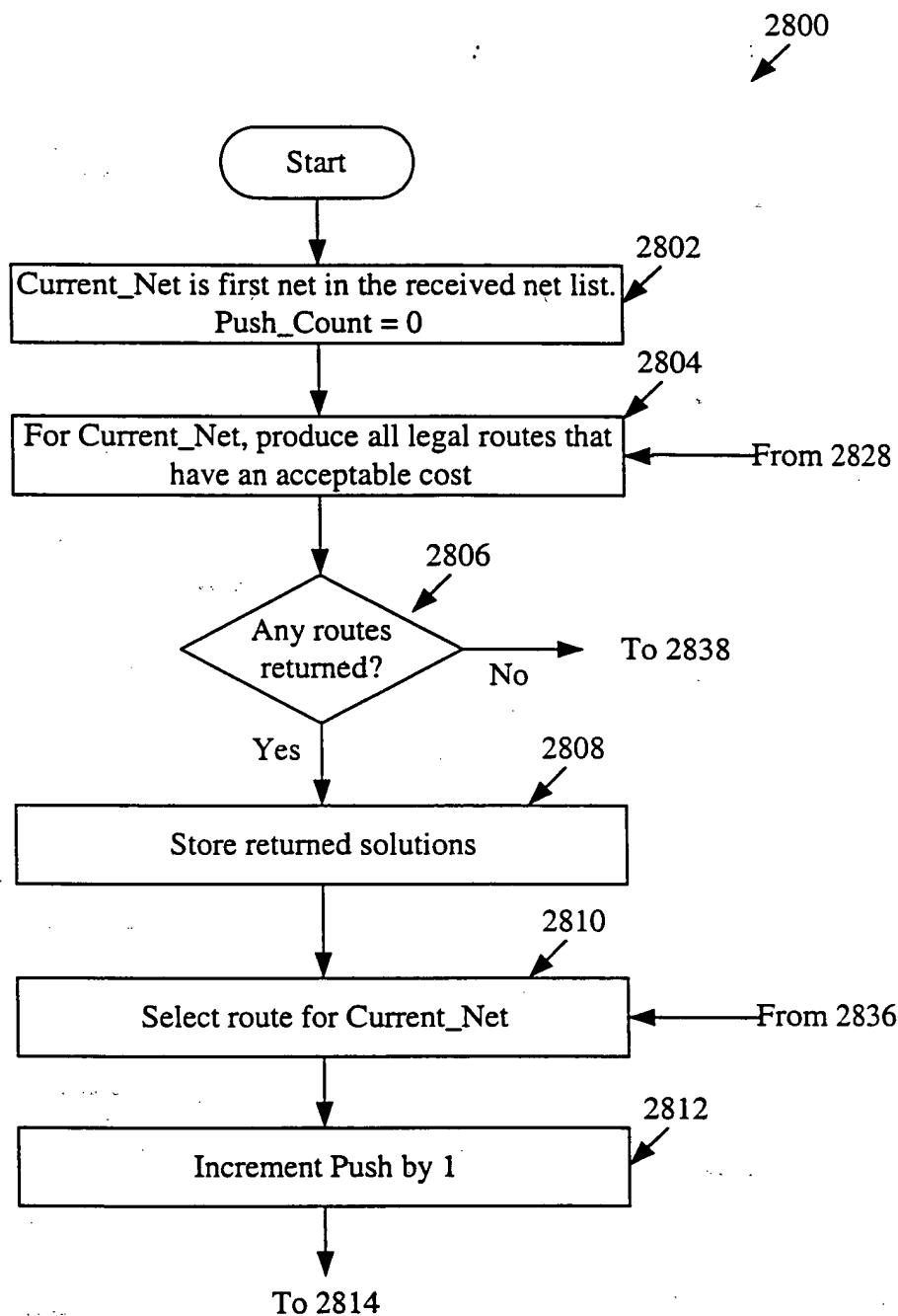


Figure 27

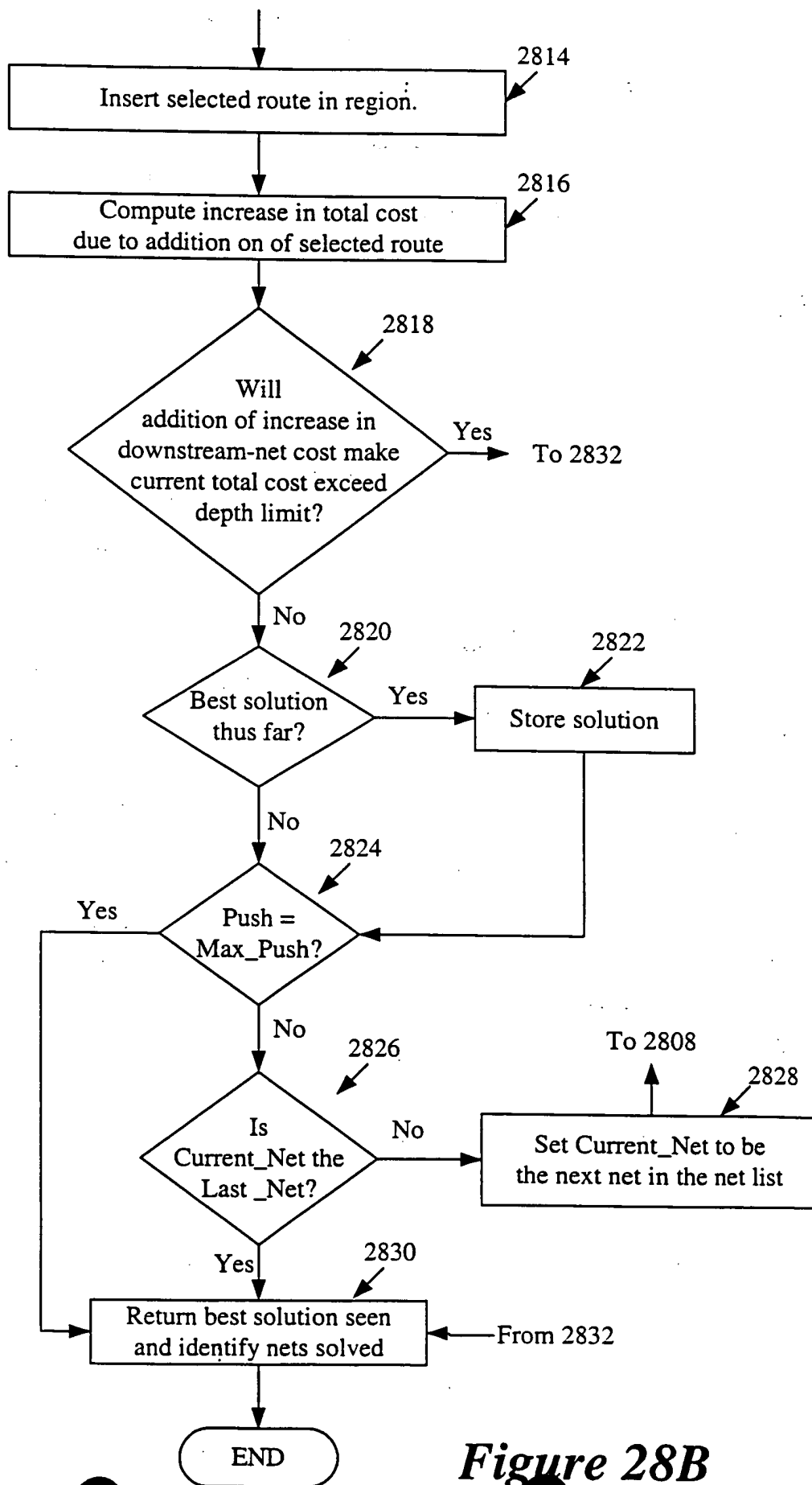
10066047-013102



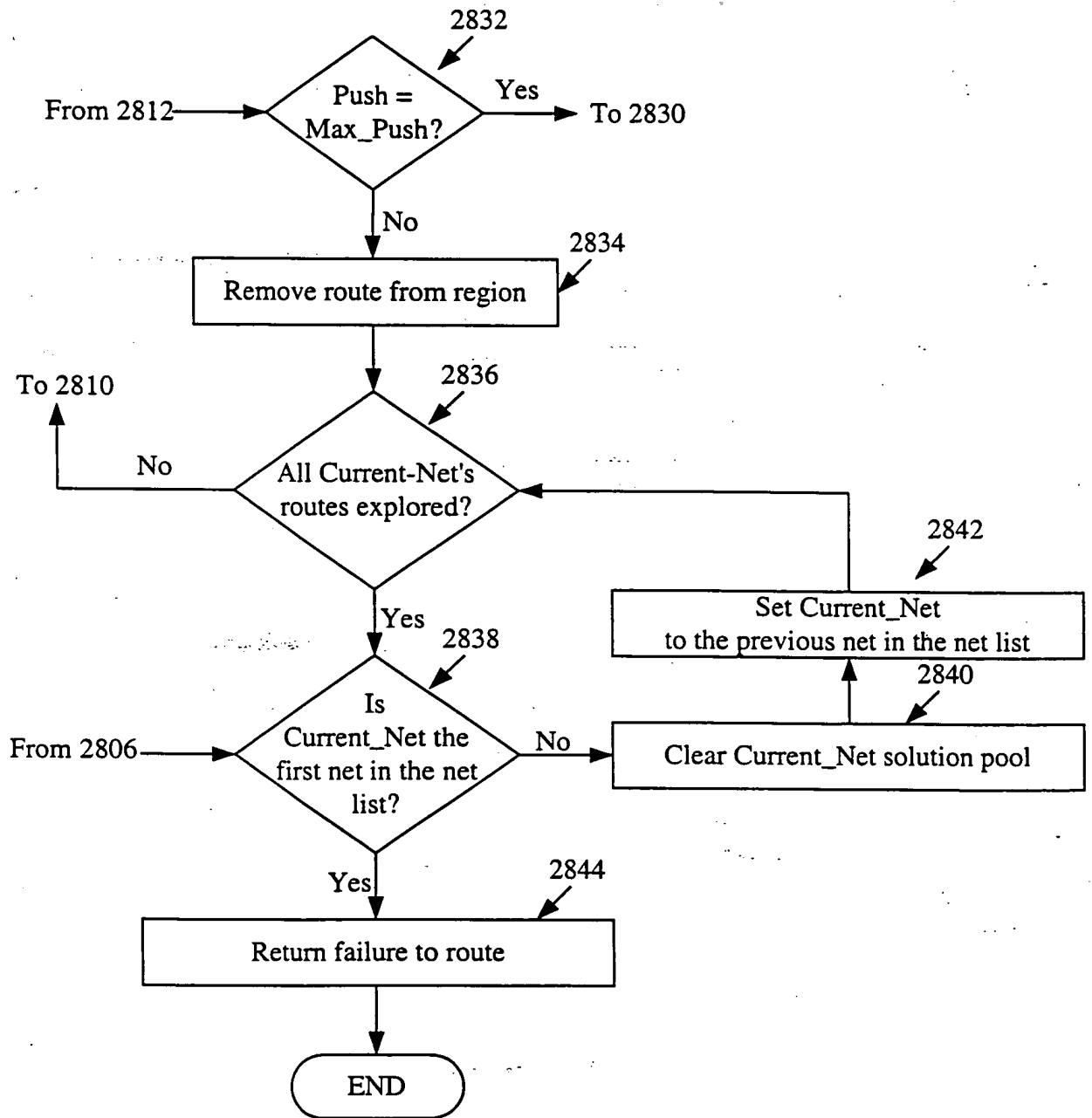
**Figure 28A**

**Figure 28:**  $\frac{\text{Figure 28A}}{\text{Figure 28B} + \text{Figure 28C}}$

10066047-013102

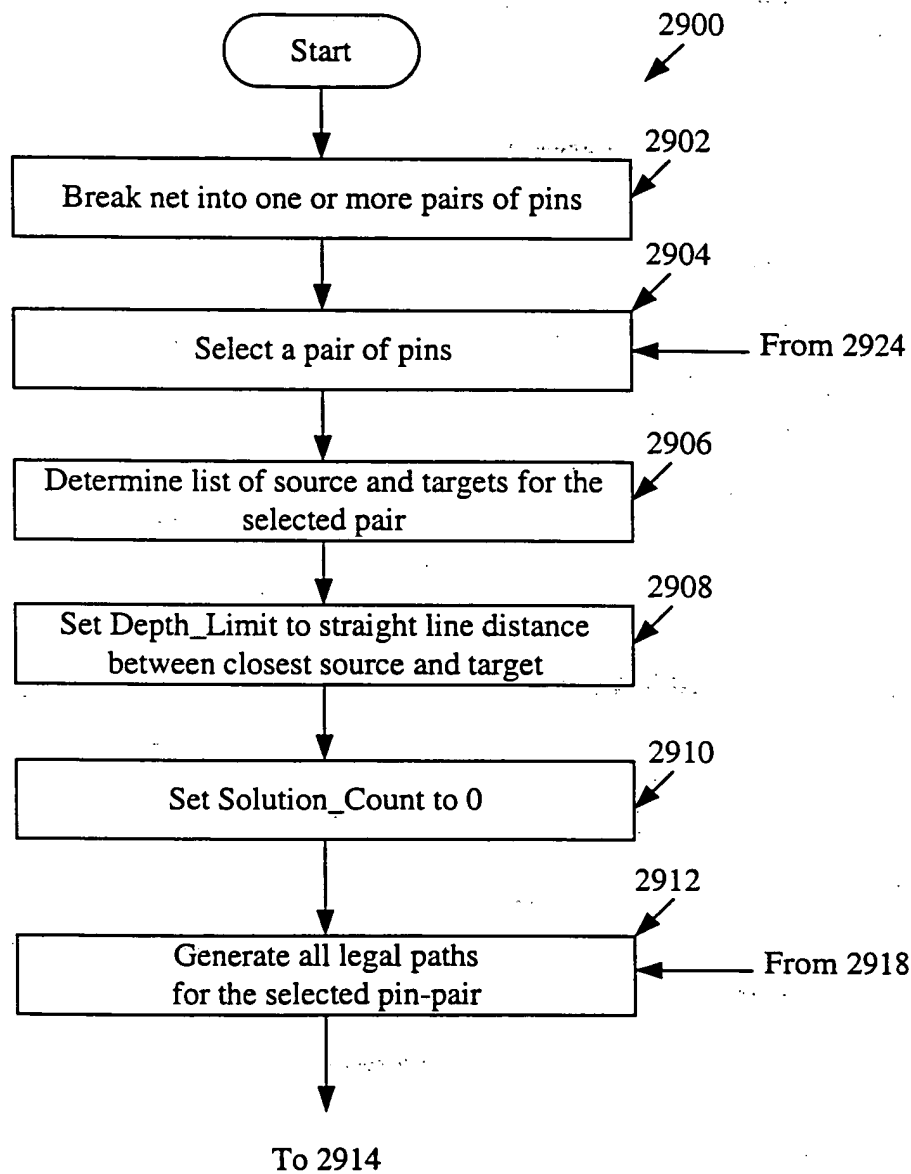


**Figure 28B**



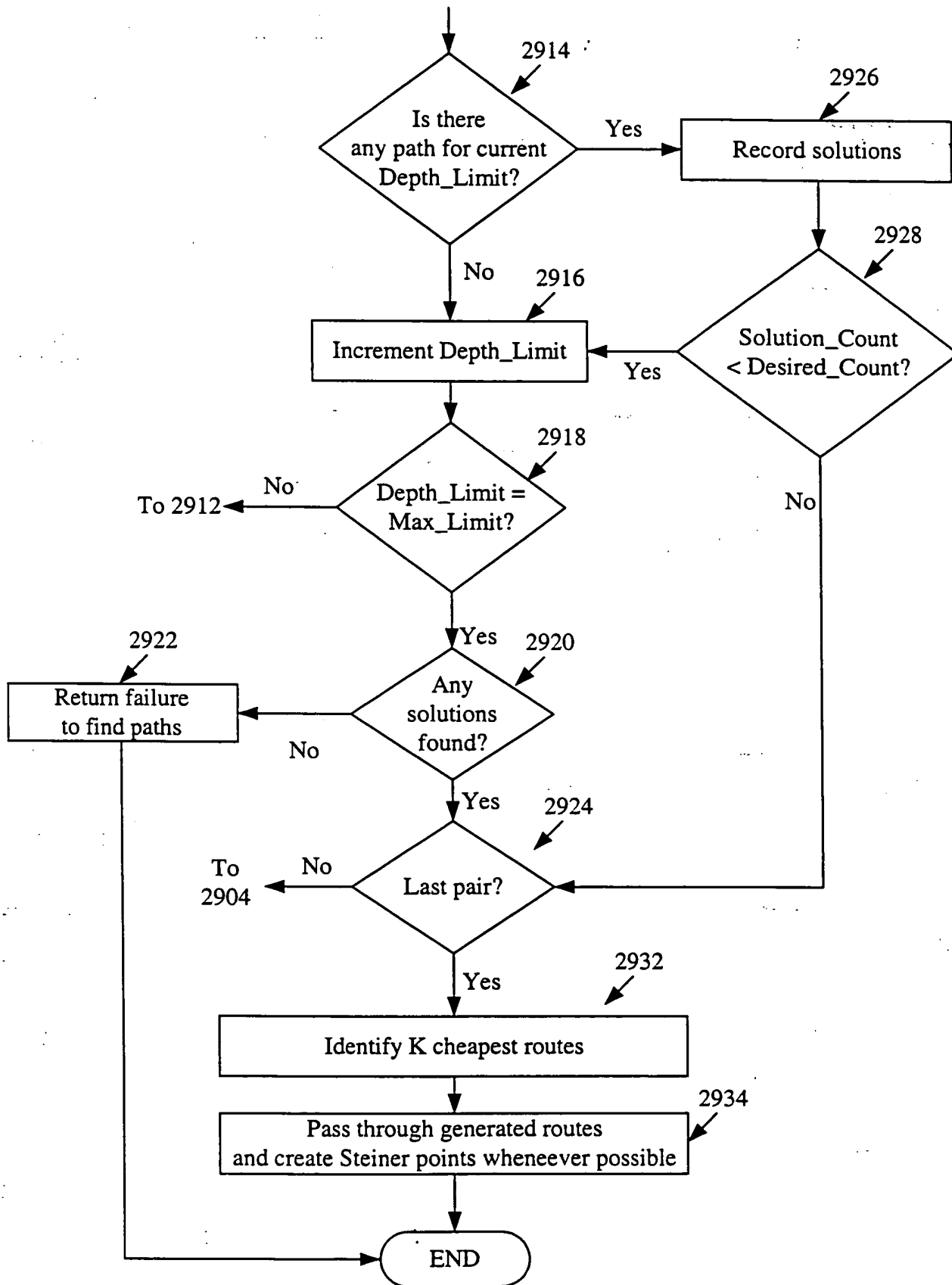
**Figure 28C**





**Figure 29A**

**Figure 29:**  $\frac{\text{Figure 29A}}{\text{Figure 29B}}$



**Figure 29B**

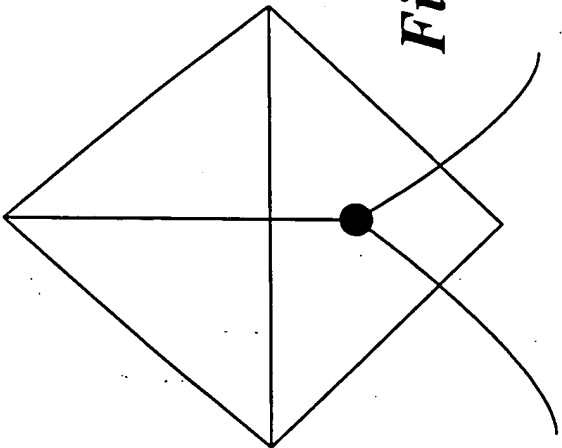
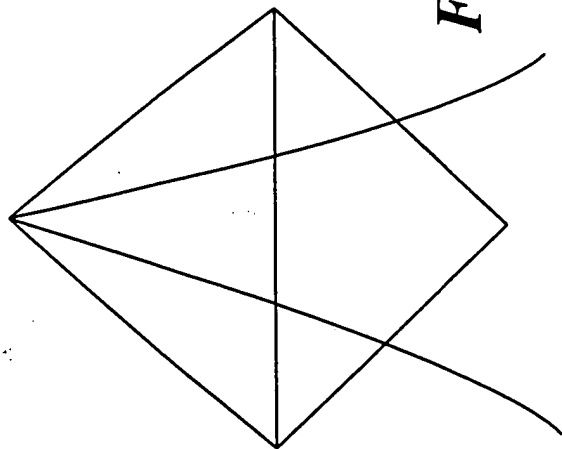


Figure 30B

Figure 30A

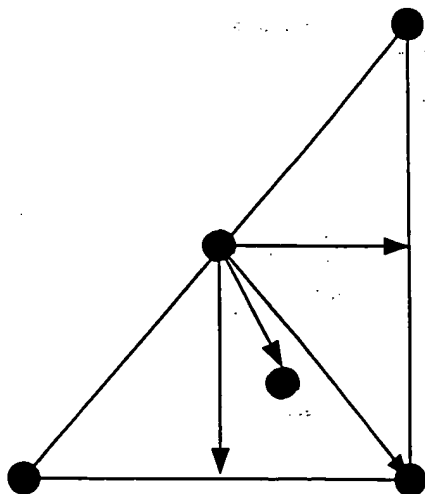


Figure 32

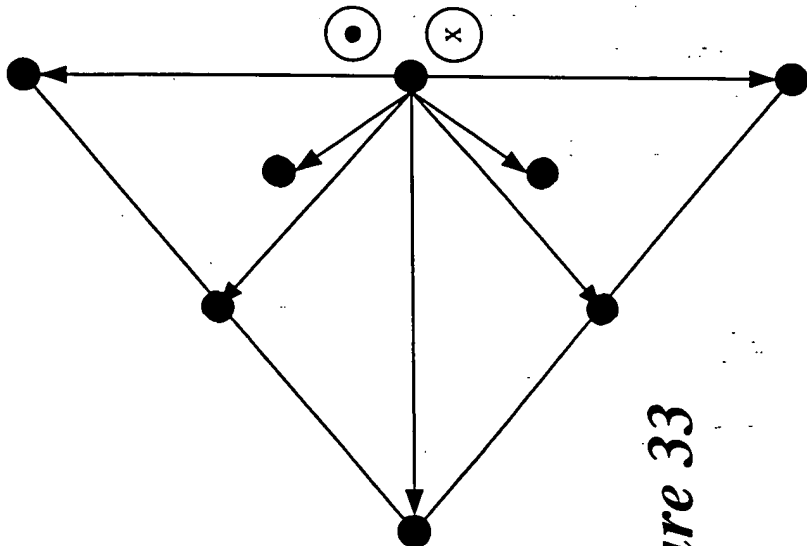


Figure 33

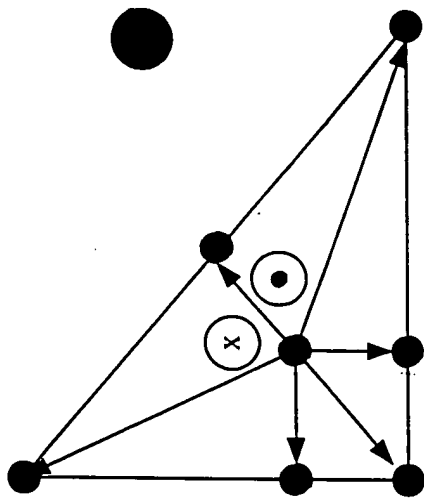
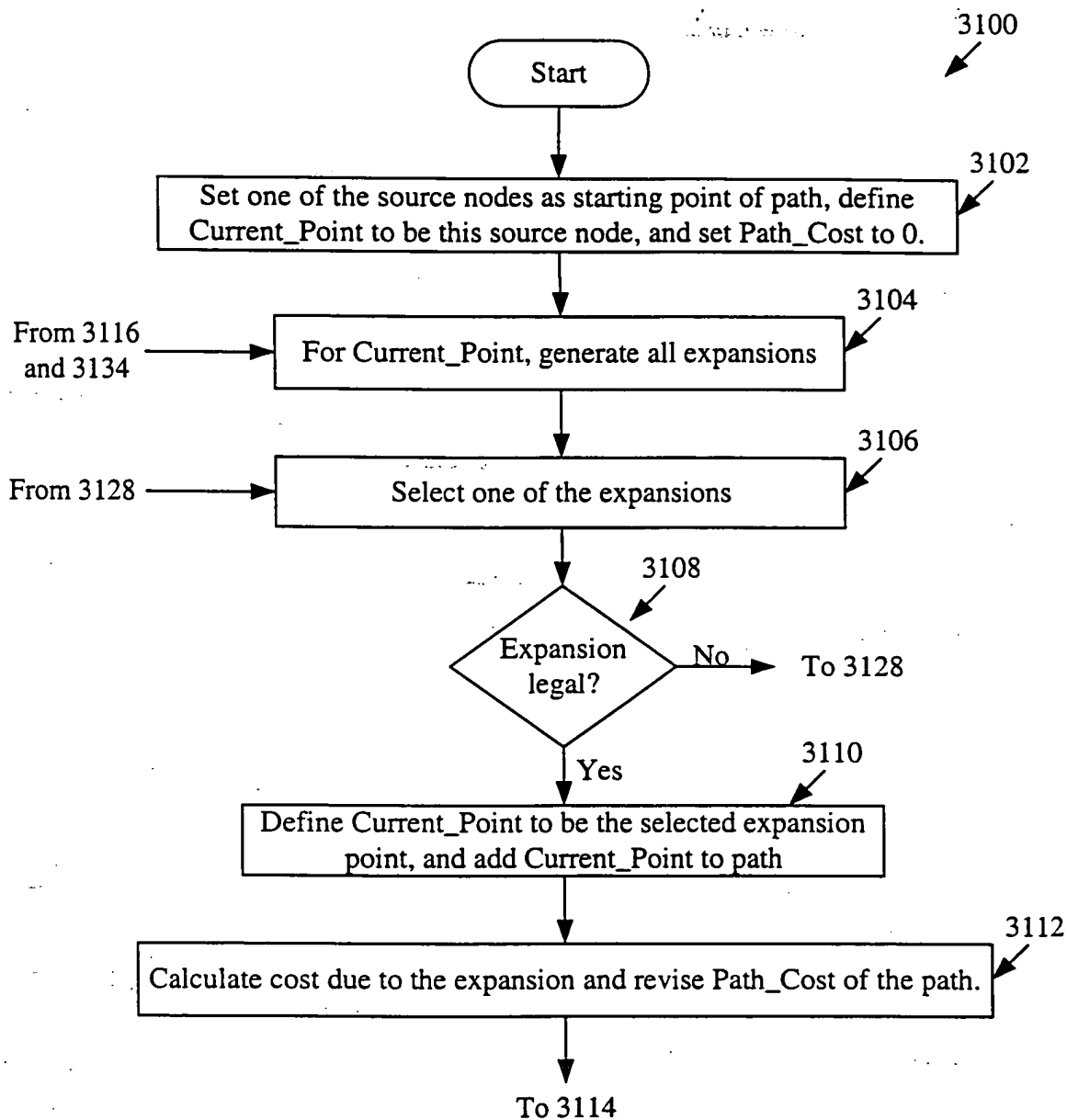
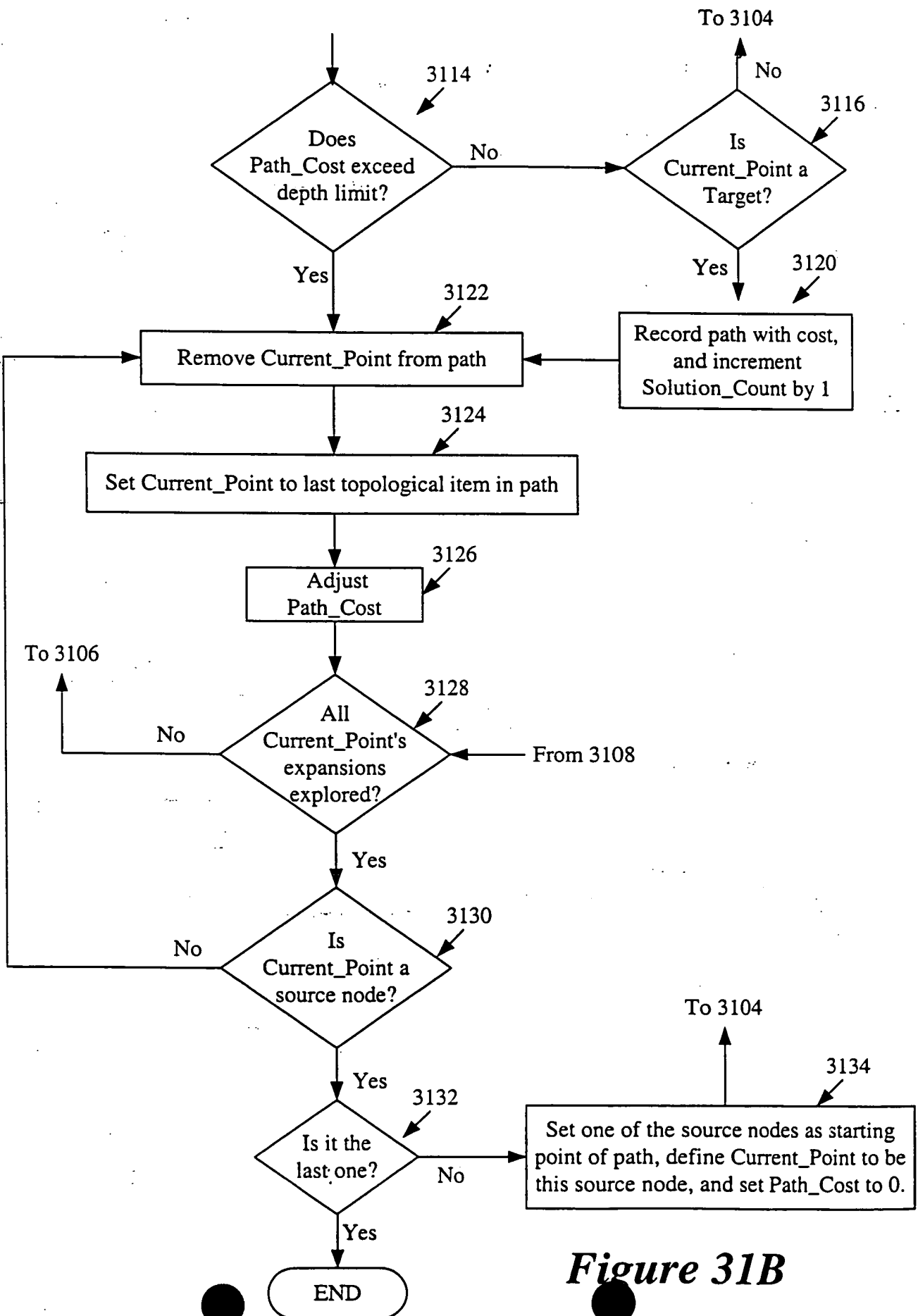


Figure 34



**Figure 31A**

**Figure 31:**  $\frac{\text{Figure 31A}}{\text{Figure 31B}}$



**Figure 31B**

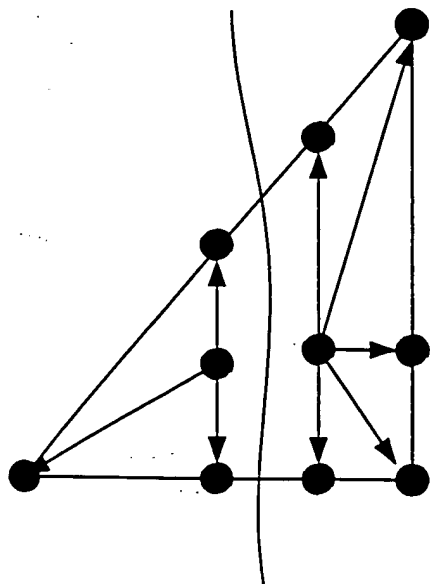


Figure 35

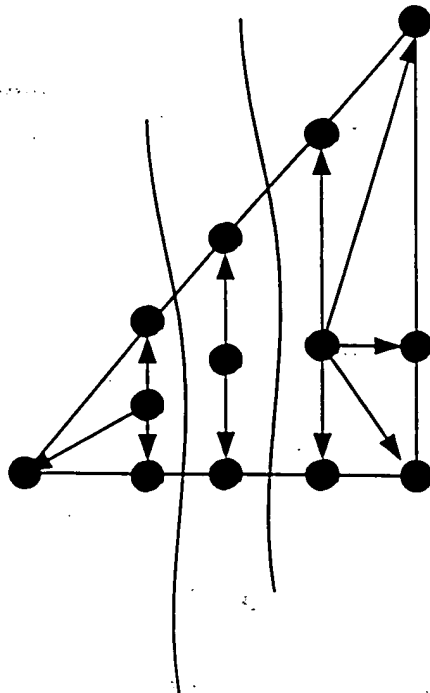


Figure 36

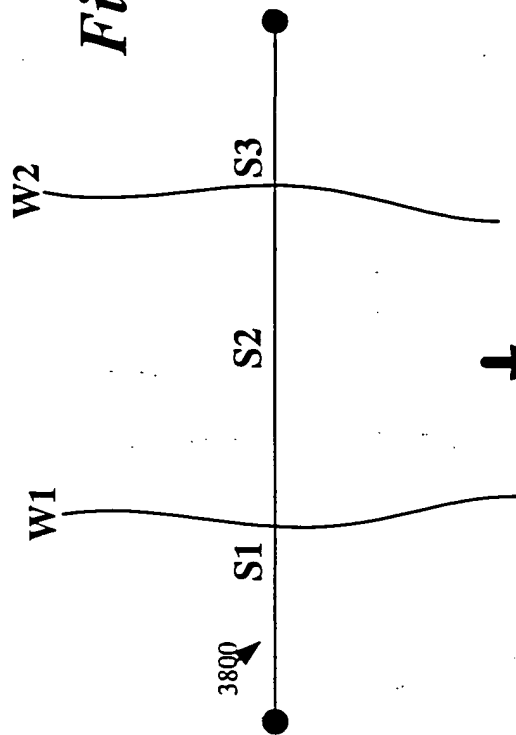


Figure 38A

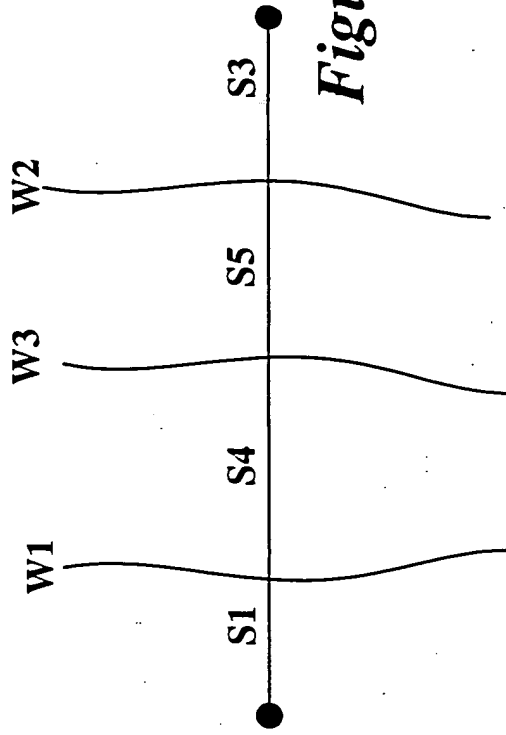
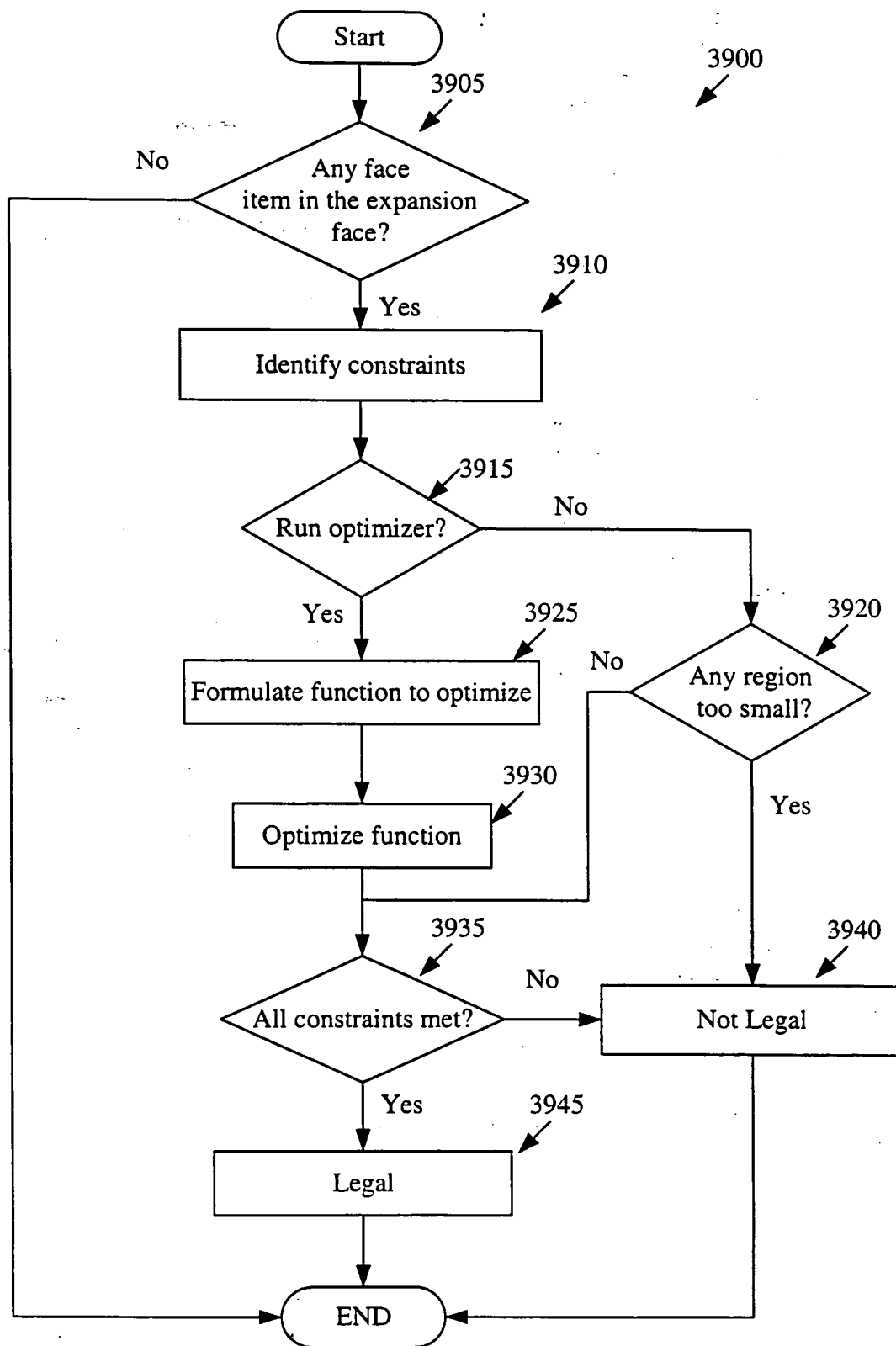


Figure 38B

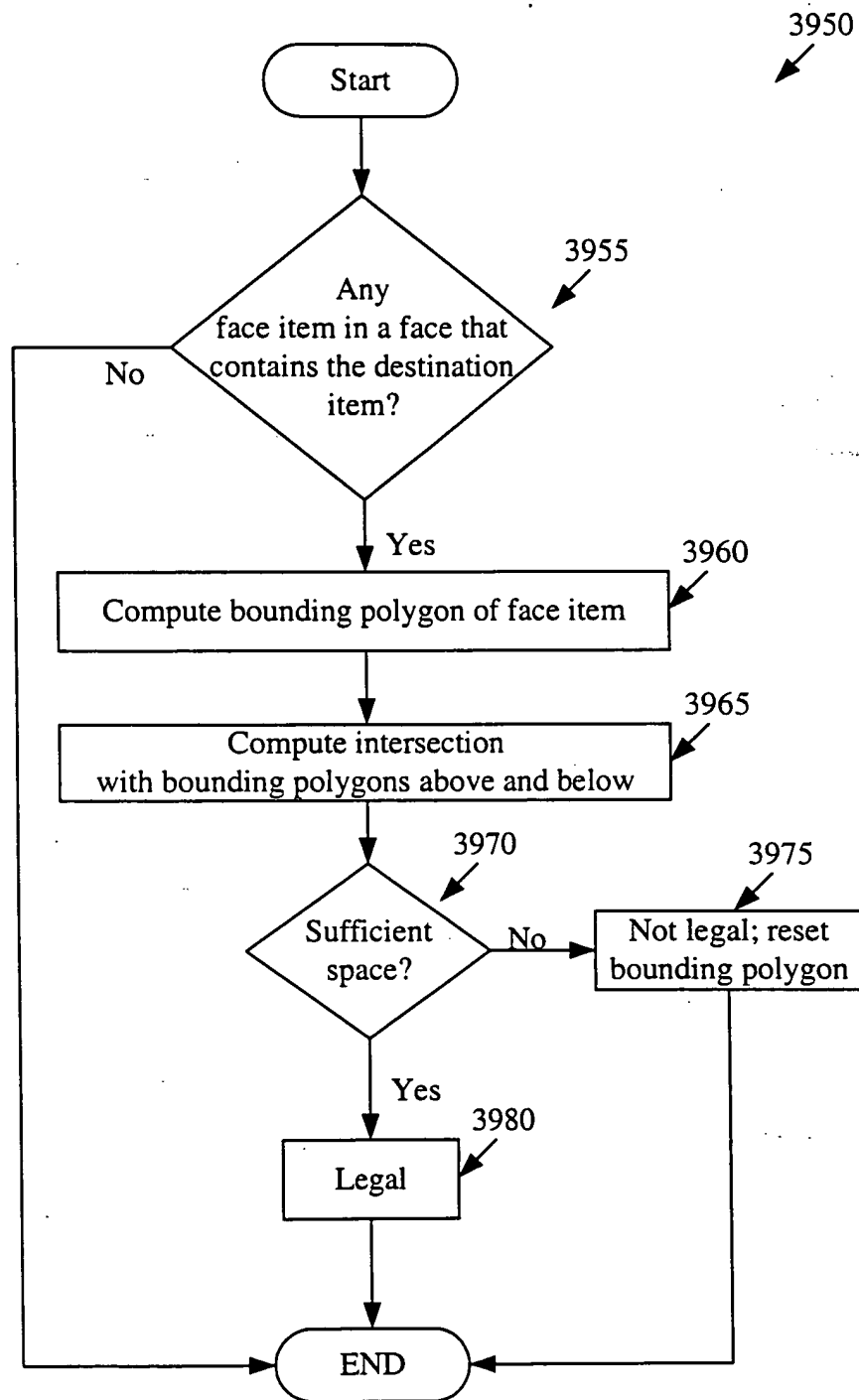
From:	To:	Node	Face Item	Edge Item
Node		<ul style="list-style-type: none"> <li>Planarity</li> <li>Vias</li> </ul>	<ul style="list-style-type: none"> <li>Vias</li> </ul>	<ul style="list-style-type: none"> <li>Planarity</li> <li>Vias</li> <li>Edge</li> <li>Capacity</li> </ul>
Face Item		<ul style="list-style-type: none"> <li>Vias</li> </ul>	<ul style="list-style-type: none"> <li>Vias</li> </ul>	<ul style="list-style-type: none"> <li>Vias</li> <li>Edge</li> <li>Capacity</li> </ul>
Edge Item		<ul style="list-style-type: none"> <li>Planarity</li> <li>Vias</li> </ul>	<ul style="list-style-type: none"> <li>Vias</li> </ul>	<ul style="list-style-type: none"> <li>Planarity</li> <li>Vias</li> <li>Edge</li> <li>Capacity</li> </ul>

Figure 37



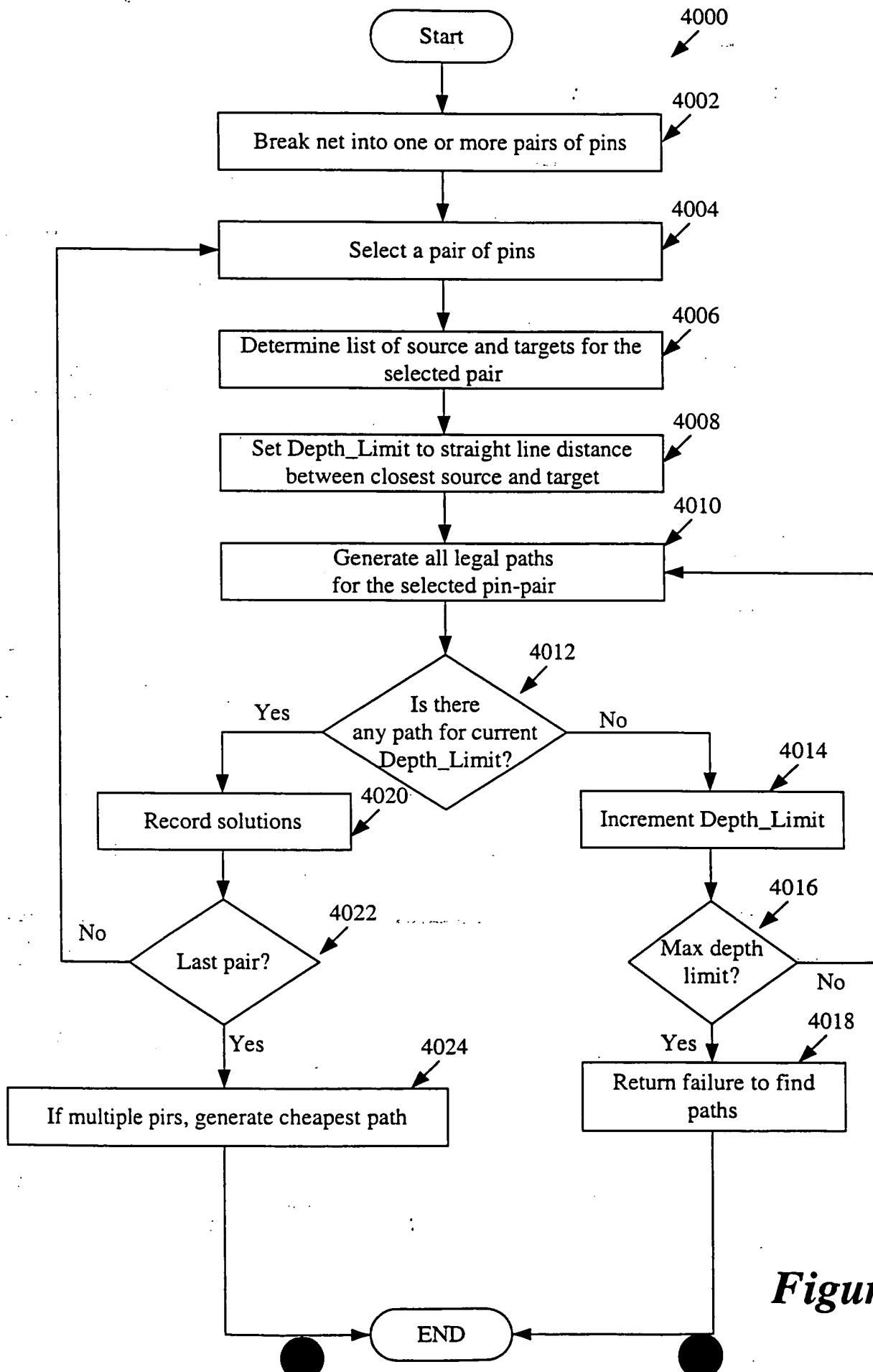
**Figure 39A**



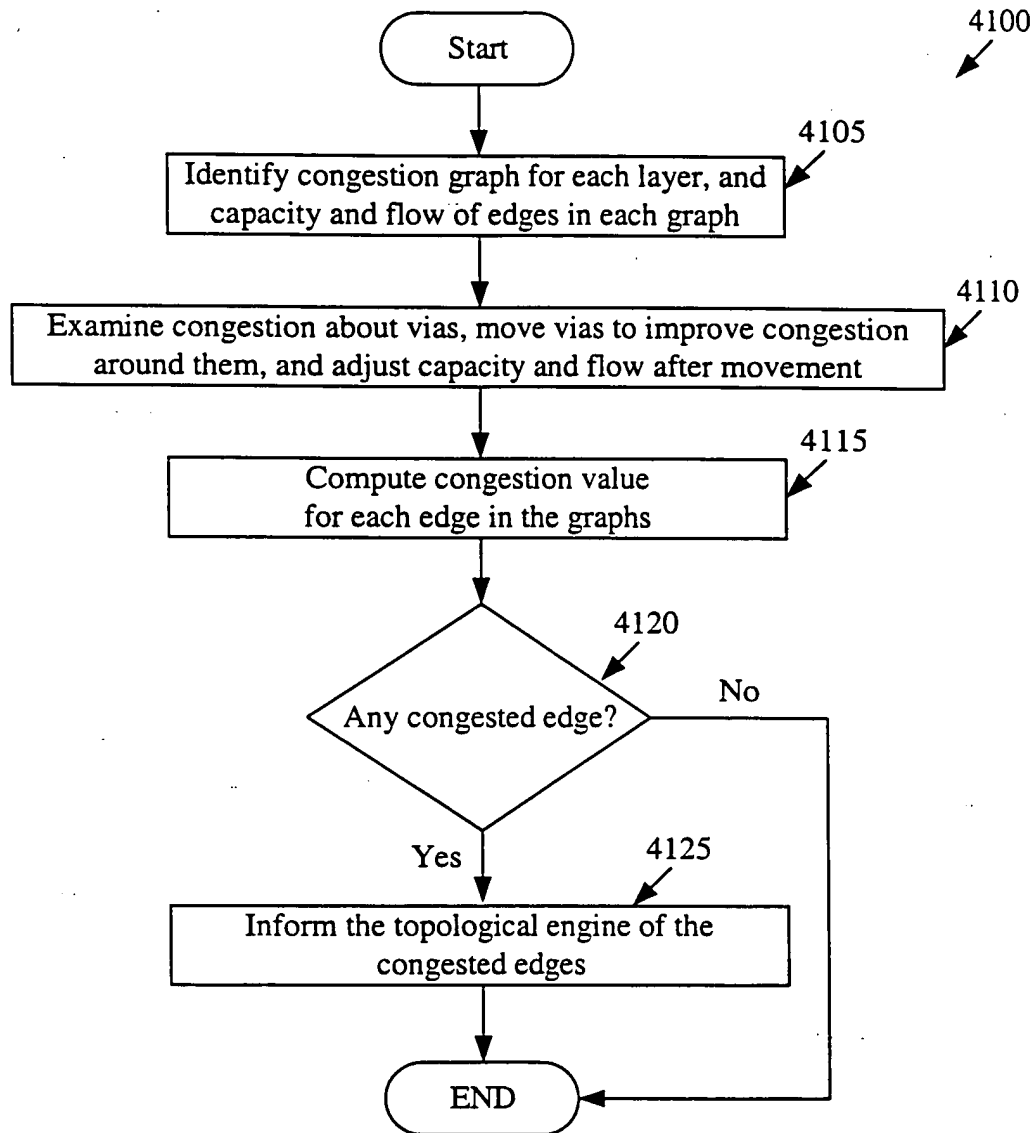


**Figure 39B**

207190-013102



*Figure 40*



**Figure 41**

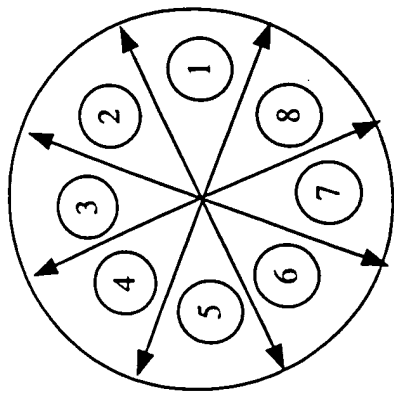


Figure 42

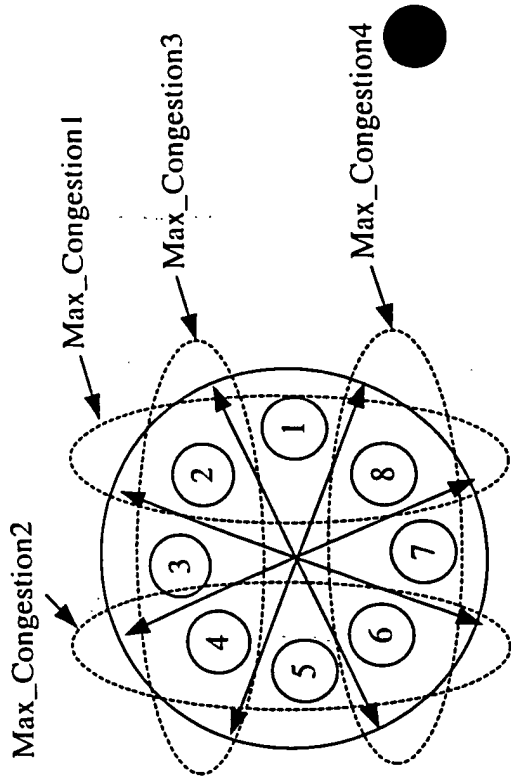


Figure 44

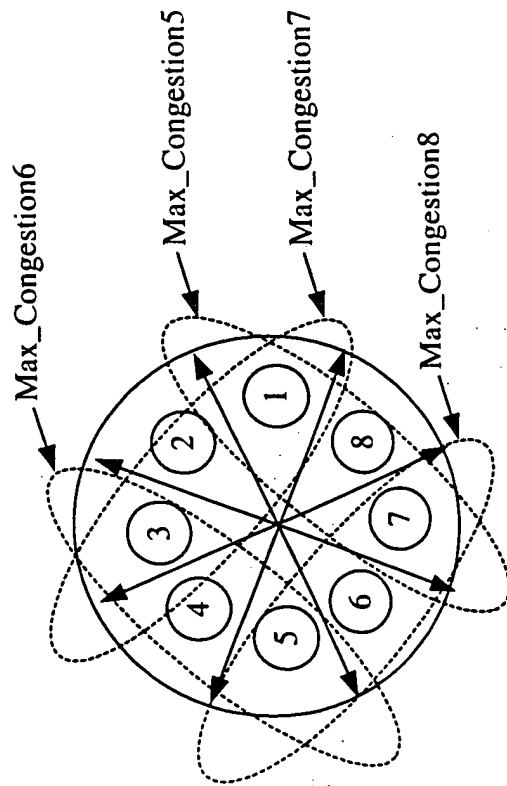


Figure 45

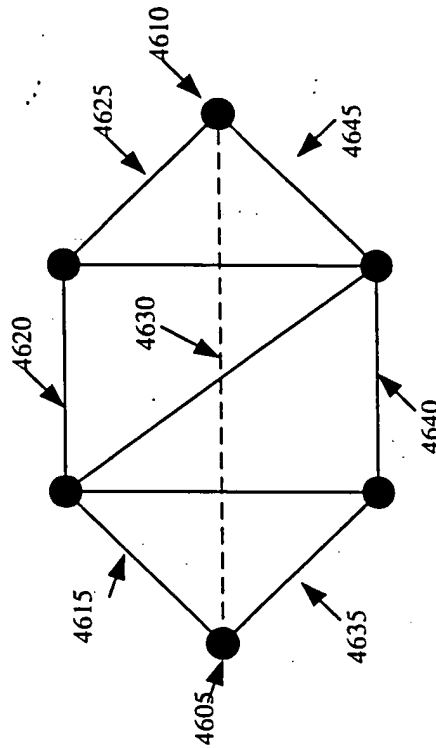
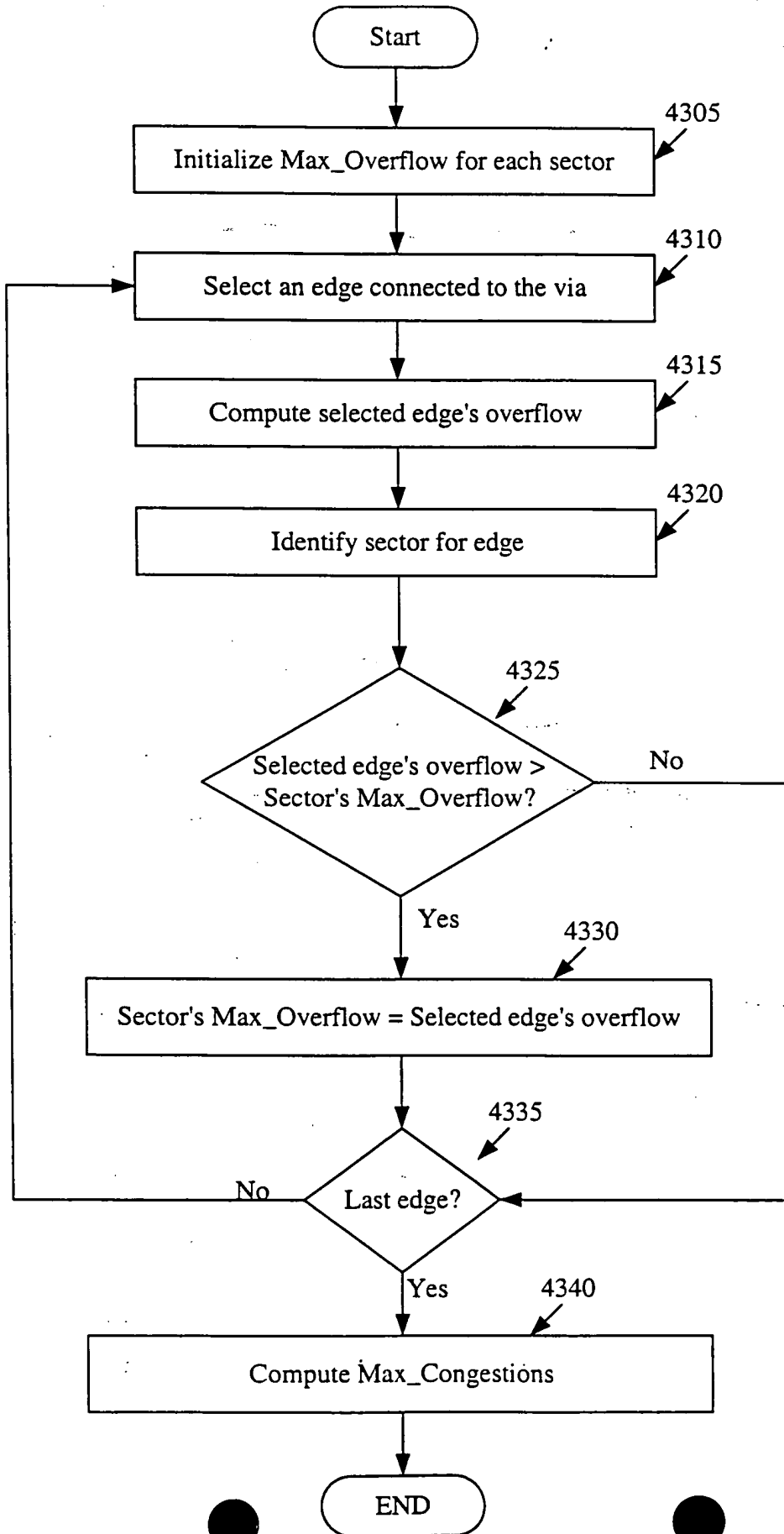


Figure 46



**Figure 43**

Hand-drawn diagram of a building layout. The layout consists of two main rooms, labeled 4710 and 4705, separated by a wall with a doorway. Room 4710 is on the left and contains a square. Room 4705 is on the right and contains a square. The entire layout is enclosed in a rectangular boundary. The diagram is drawn with black lines on a white background.

FIGURE 47

10066047-013402

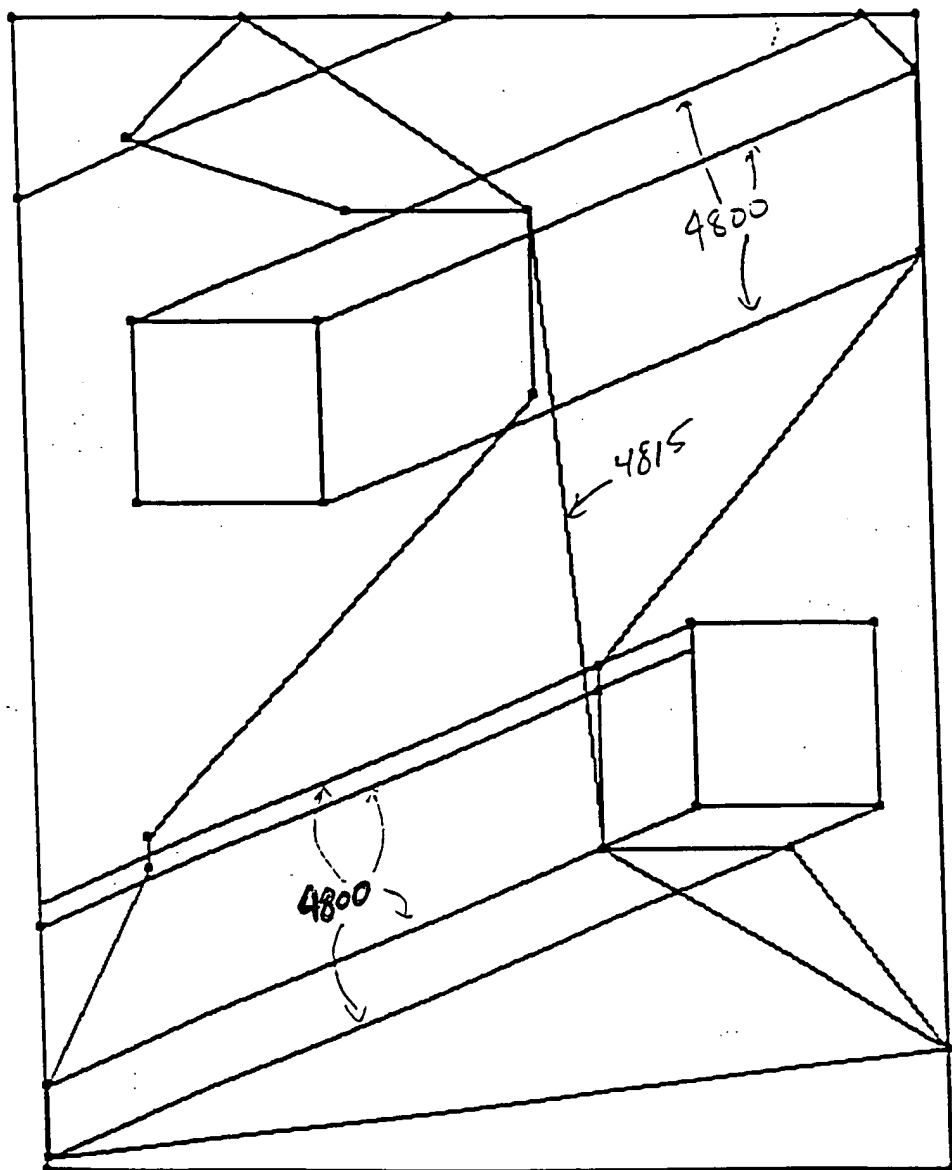


FIGURE 48A

201310-2409900T

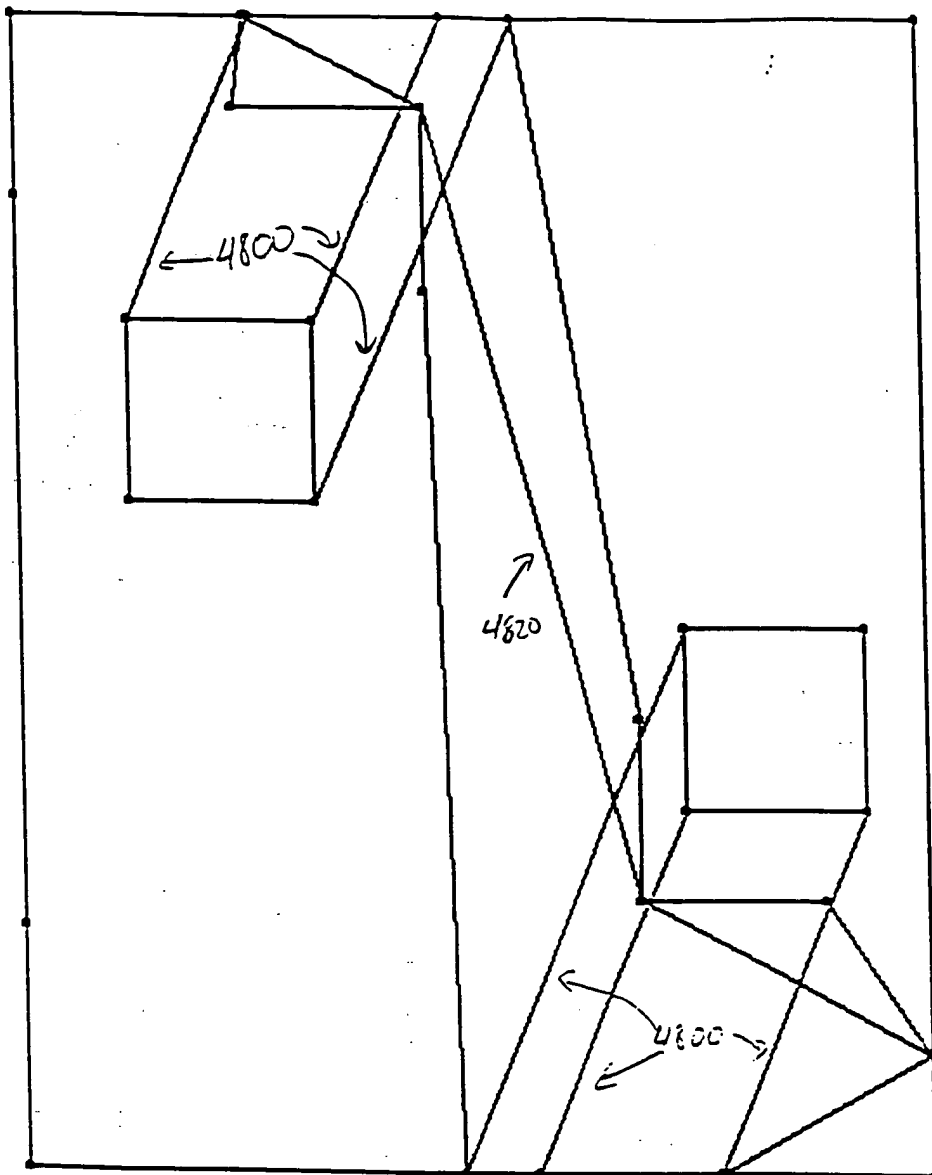


FIGURE 48B



10056047-013102

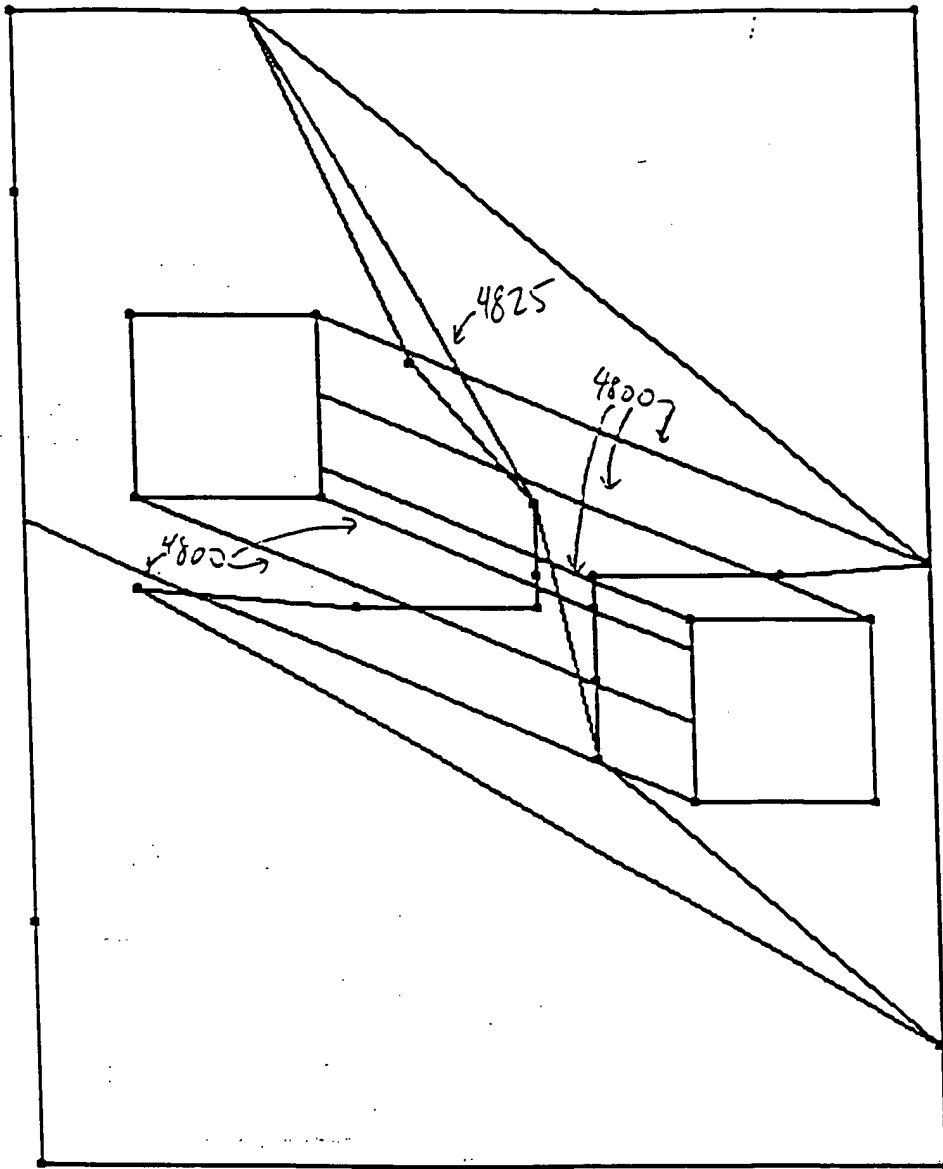


FIGURE 48C

10066047-013102

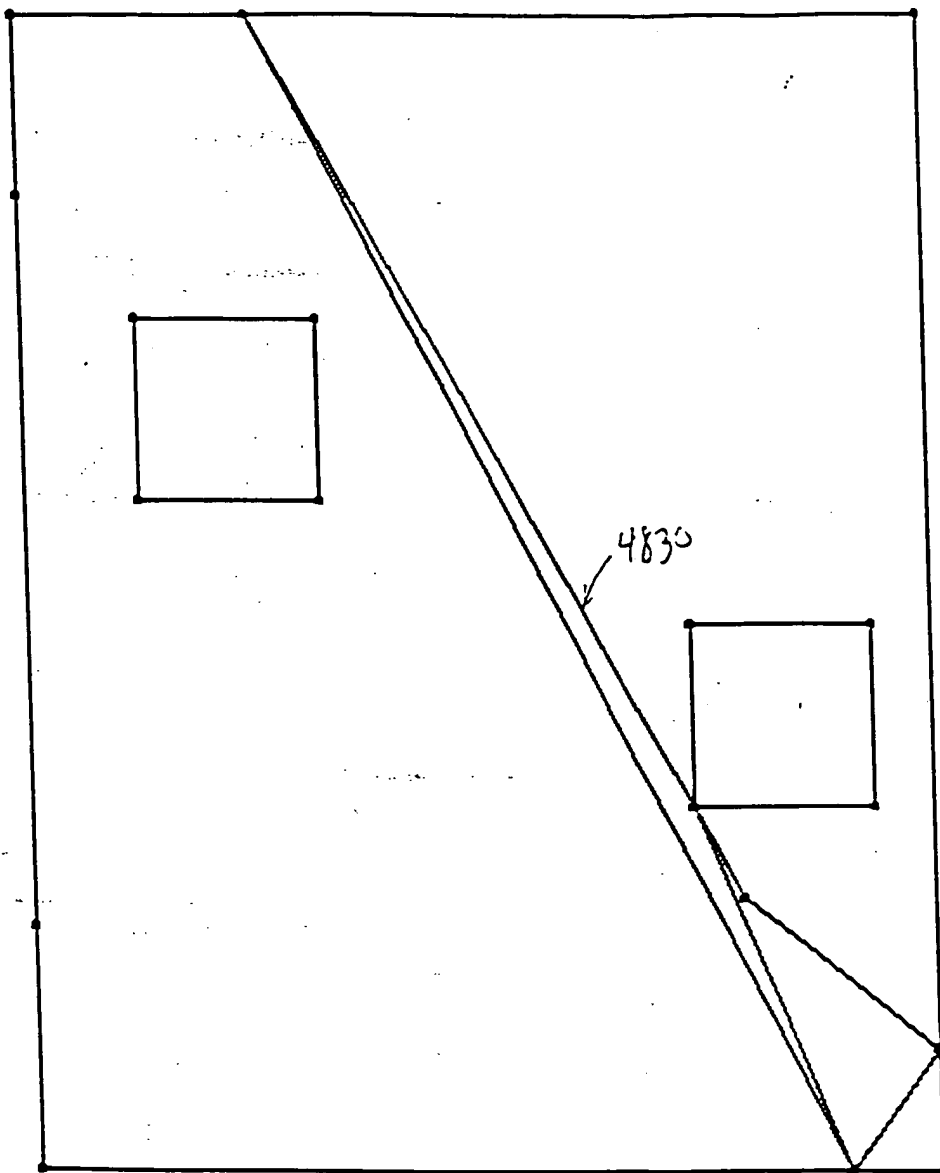


FIGURE 48D



Figure 49A

Figure 49B

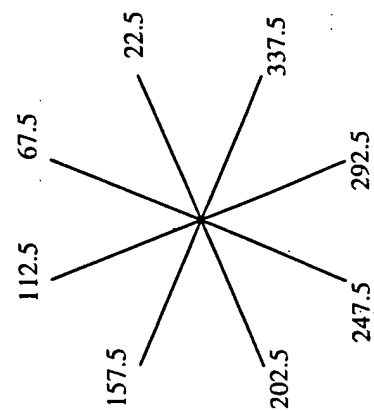


Figure 49C

10065047.013102

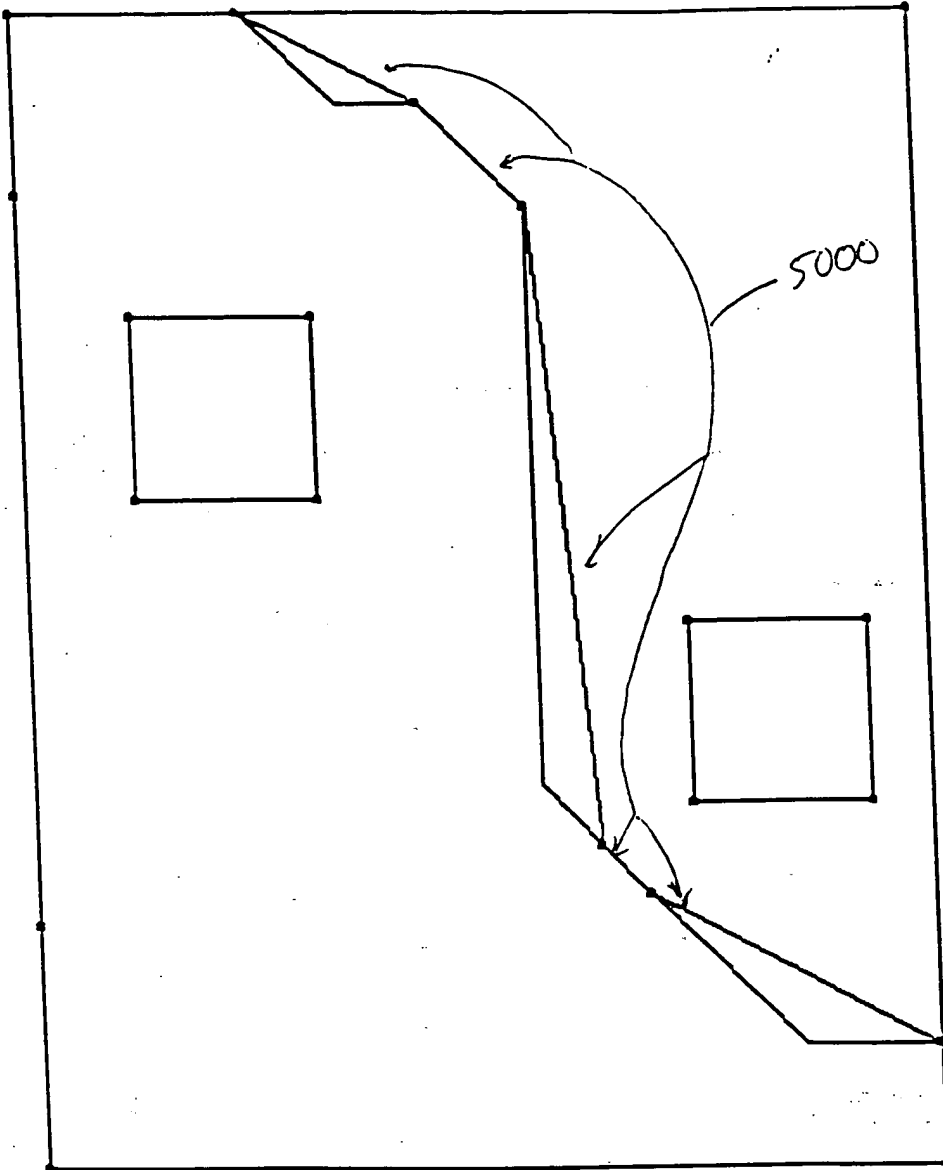
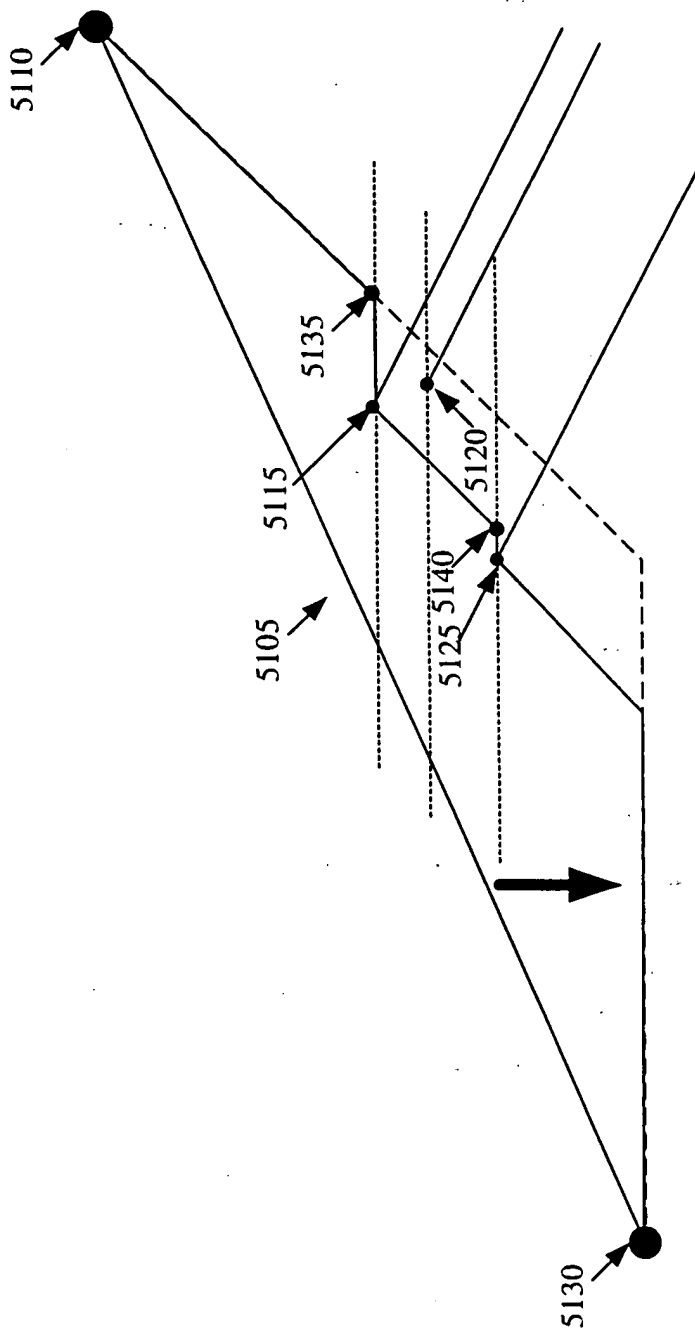


FIGURE 50

**SECRET**



**Figure 51**

10066047.013102

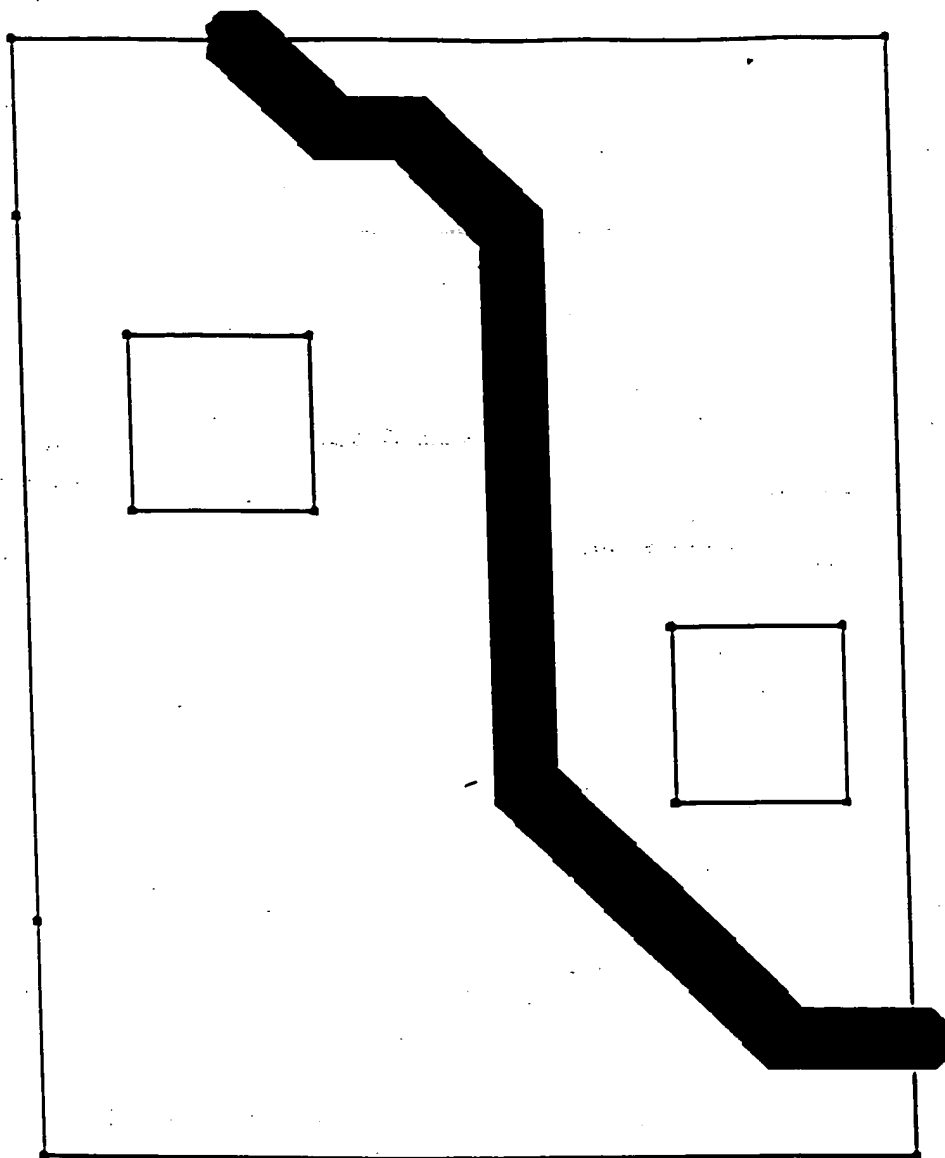
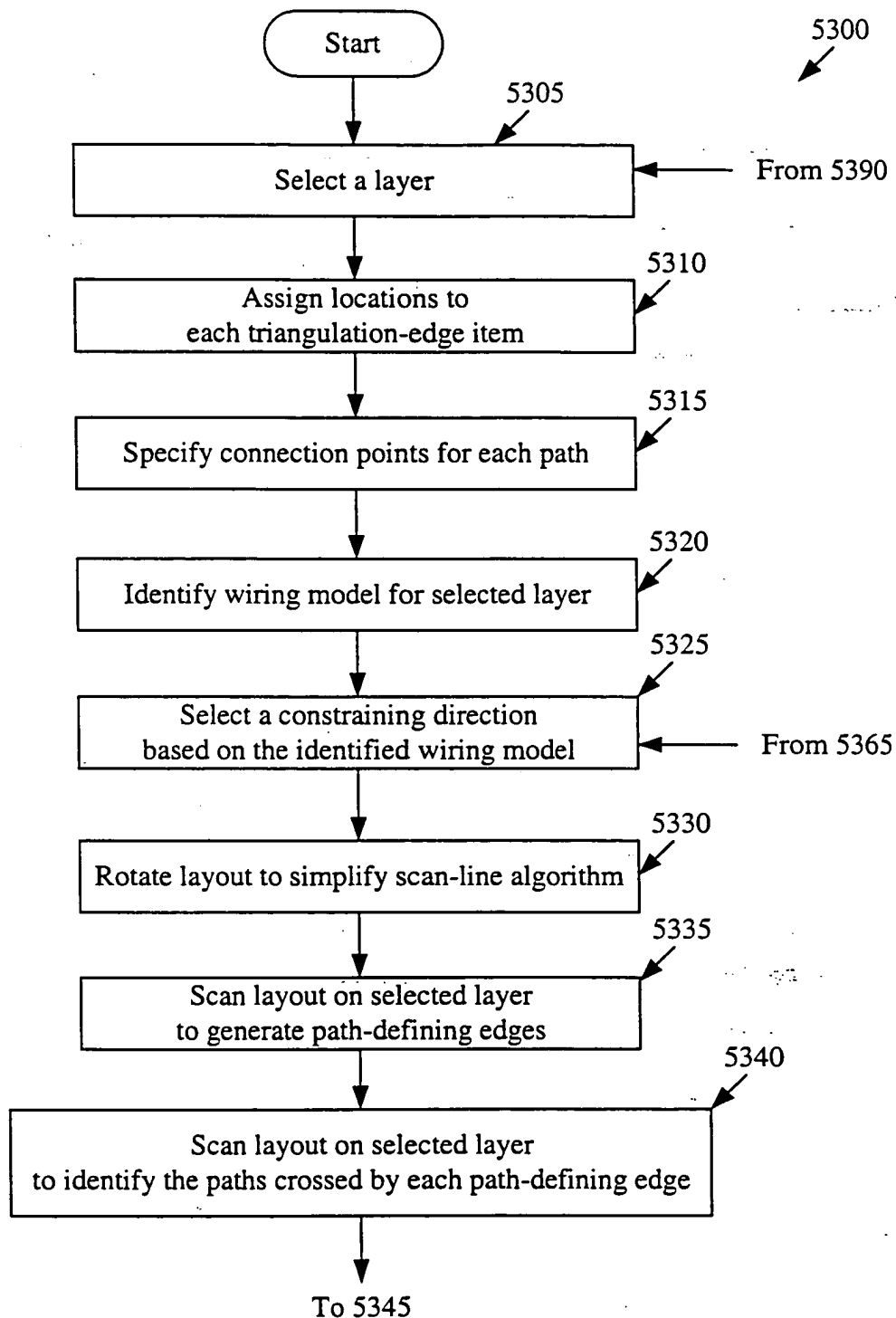
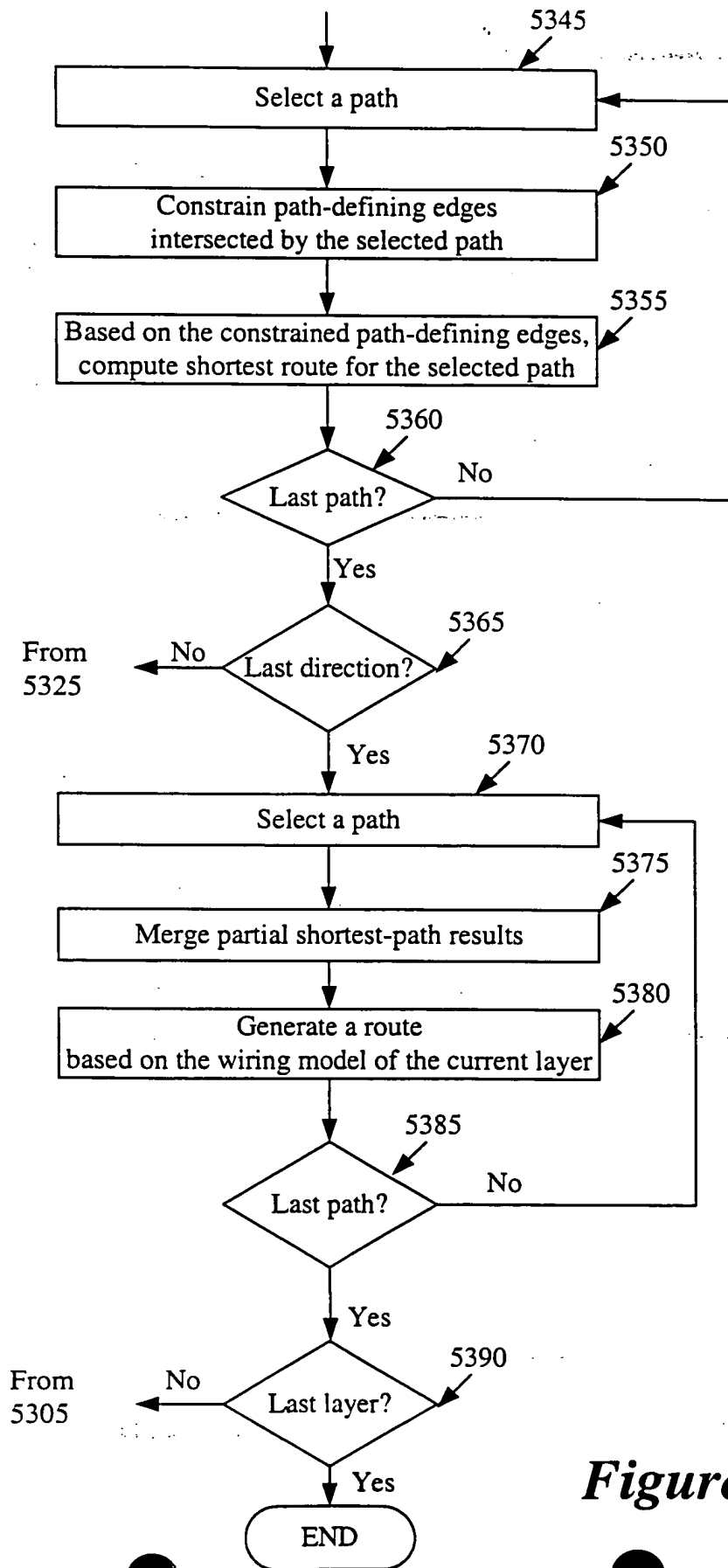


FIGURE 52



**Figure 53**

**Figure 53:** Figure 53A  
**Figure 53B**



**Figure 53B**



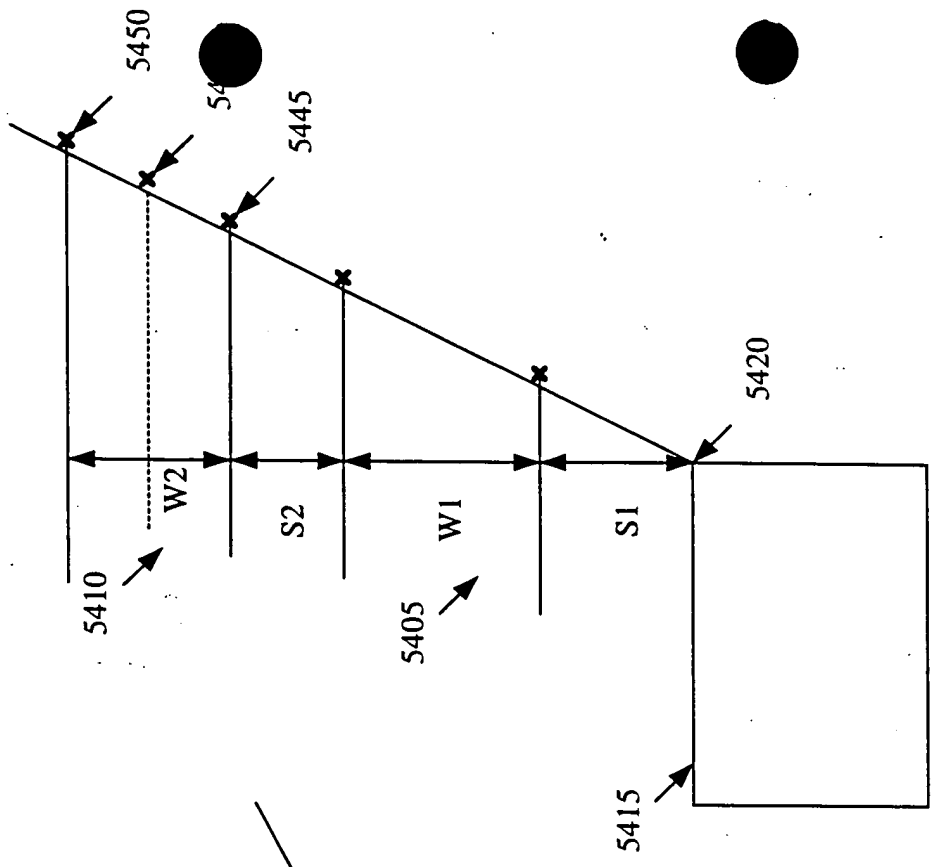


Figure 54

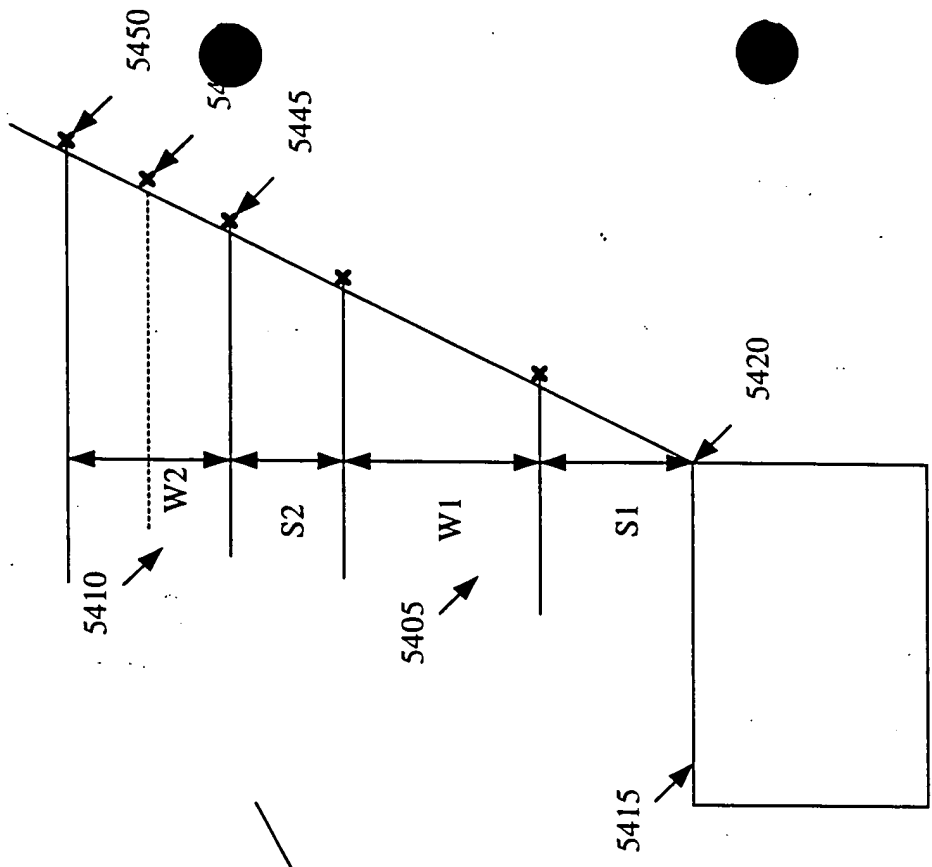


Figure 55



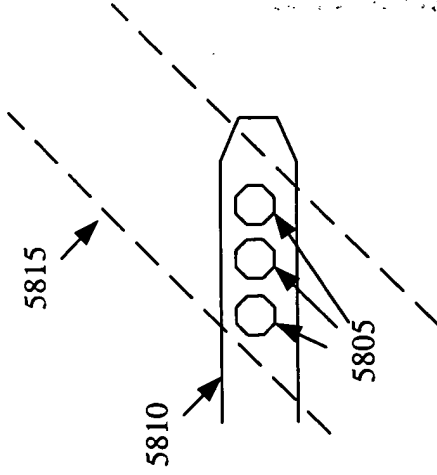


Figure 58

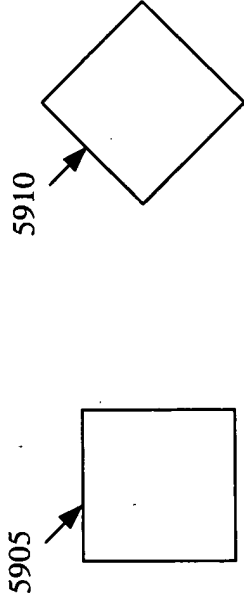


Figure 59

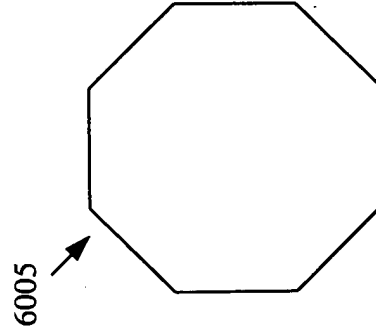


Figure 60

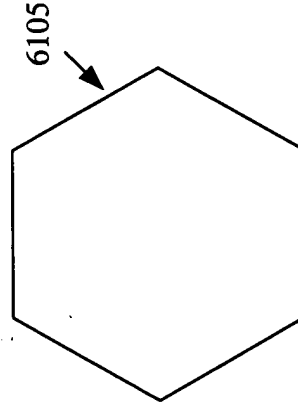


Figure 61

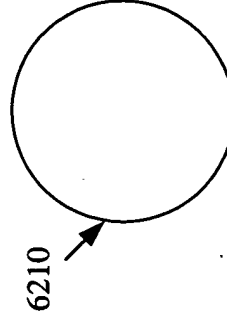


Figure 62

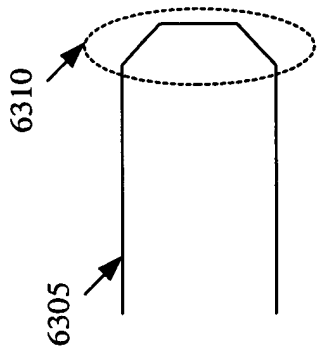


Figure 63

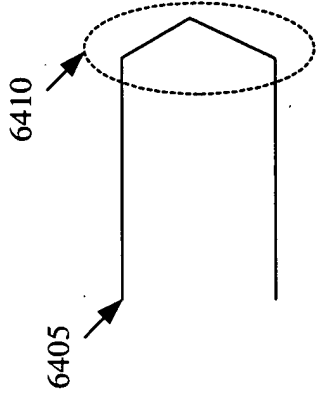


Figure 64

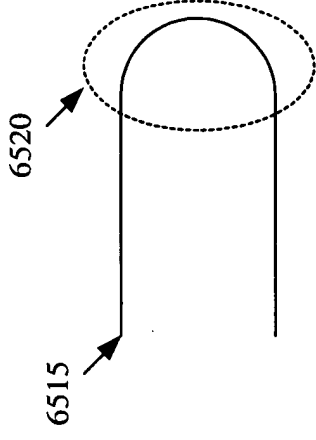
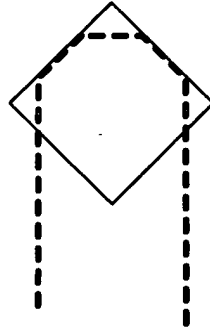


Figure 65

(1)



(2)



(3)

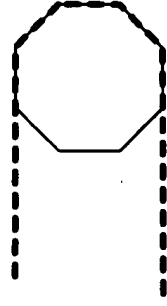
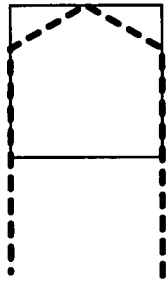


Figure 66

(1)



(2)

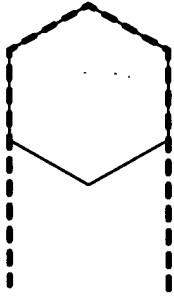


Figure 67

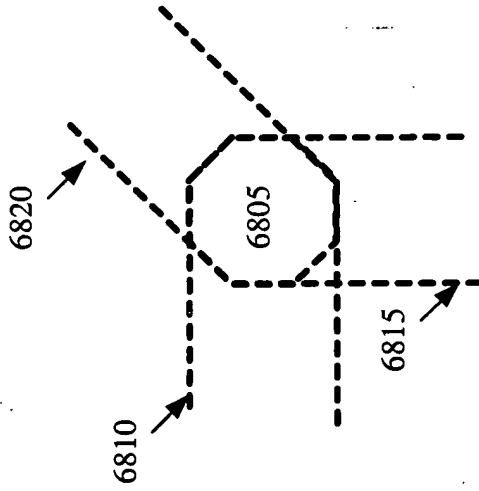


Figure 68

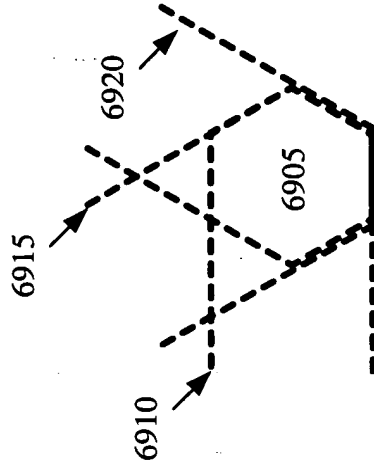


Figure 69

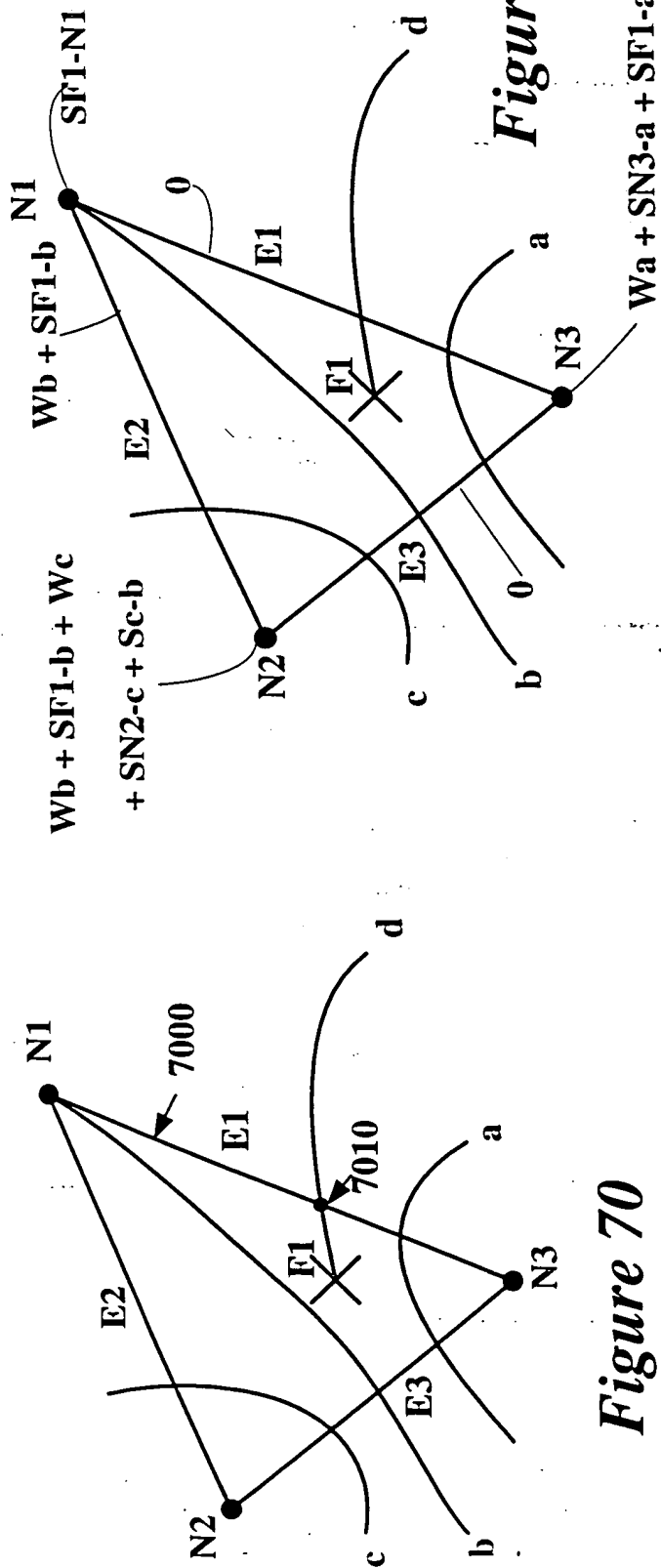


Figure 70

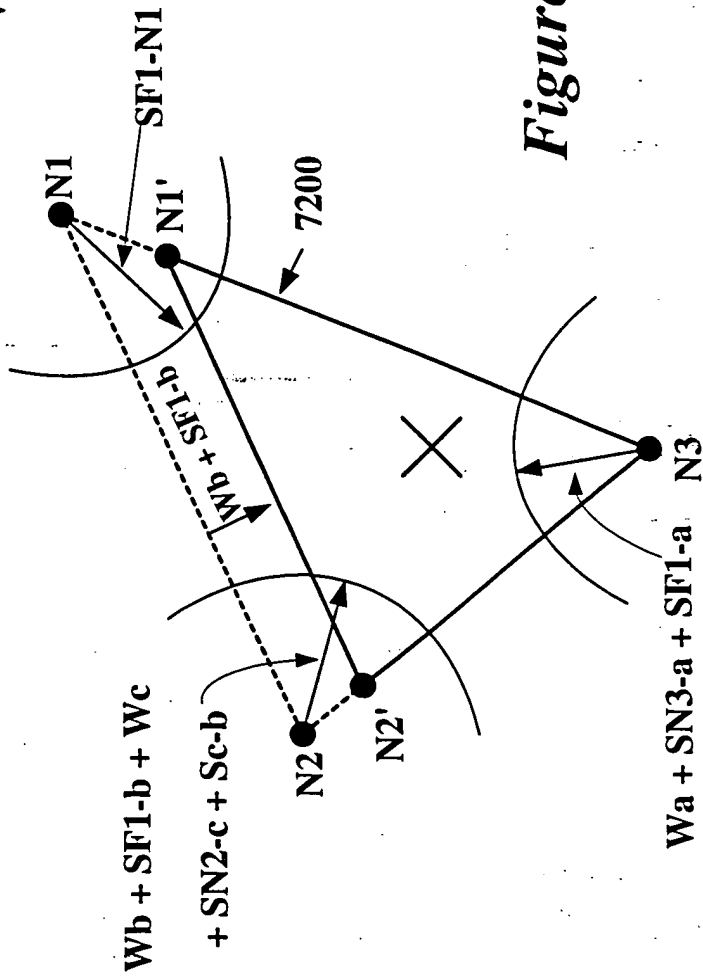


Figure 72







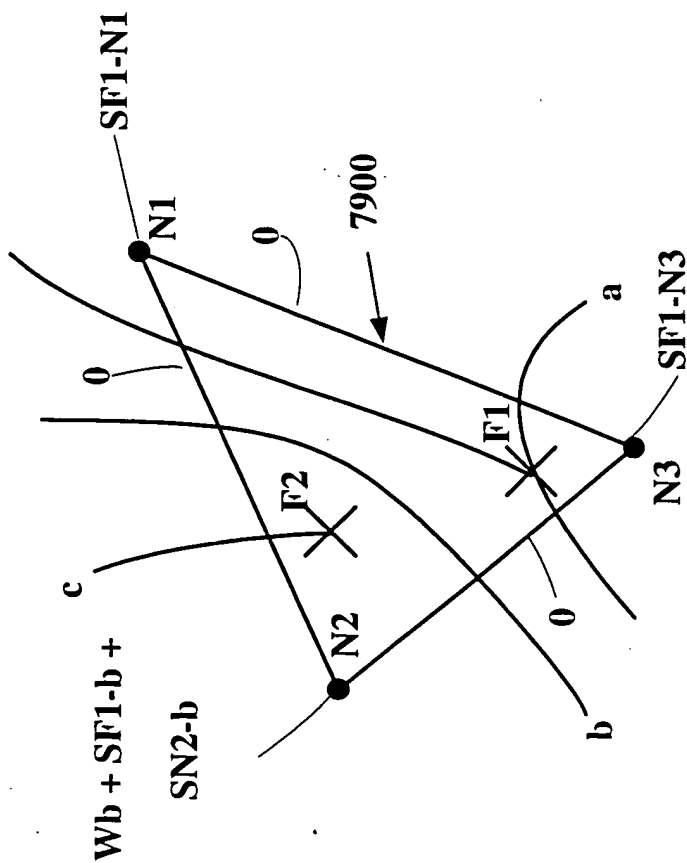


Figure 79

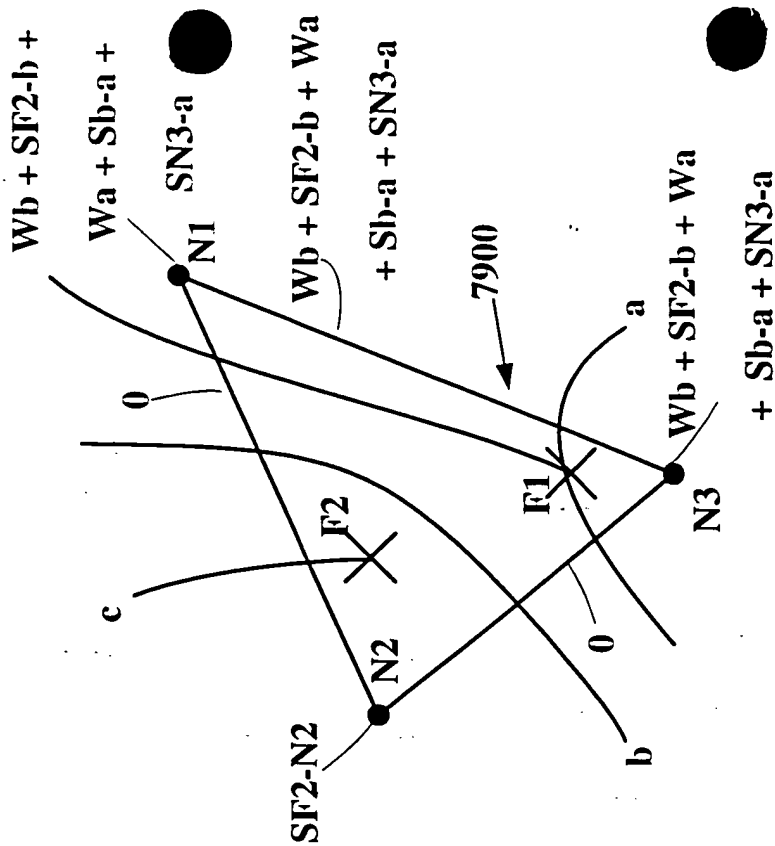


Figure 80

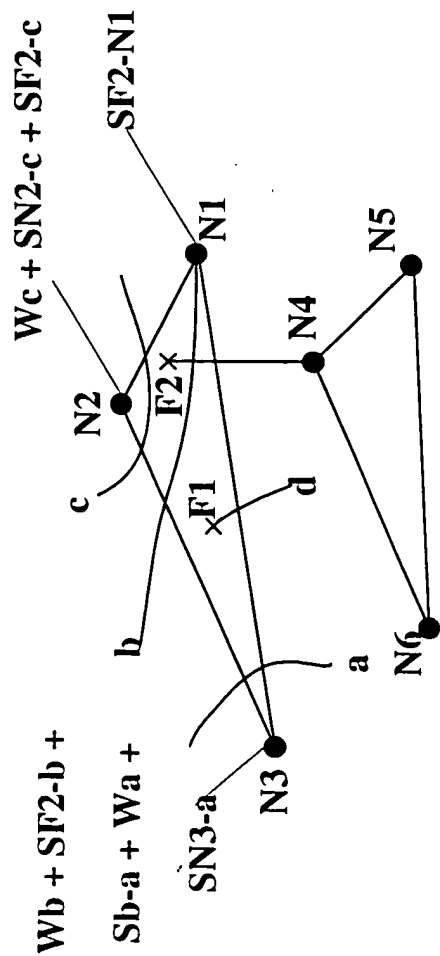


Figure 81

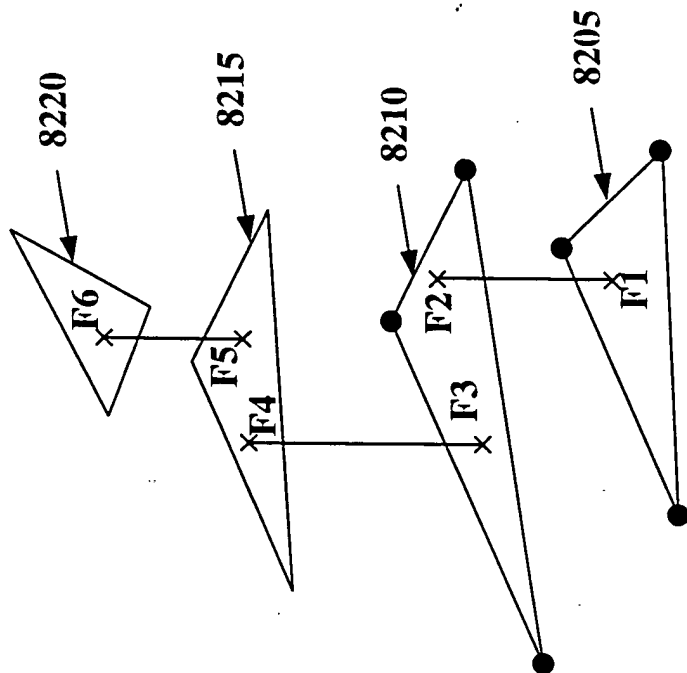


Figure 82

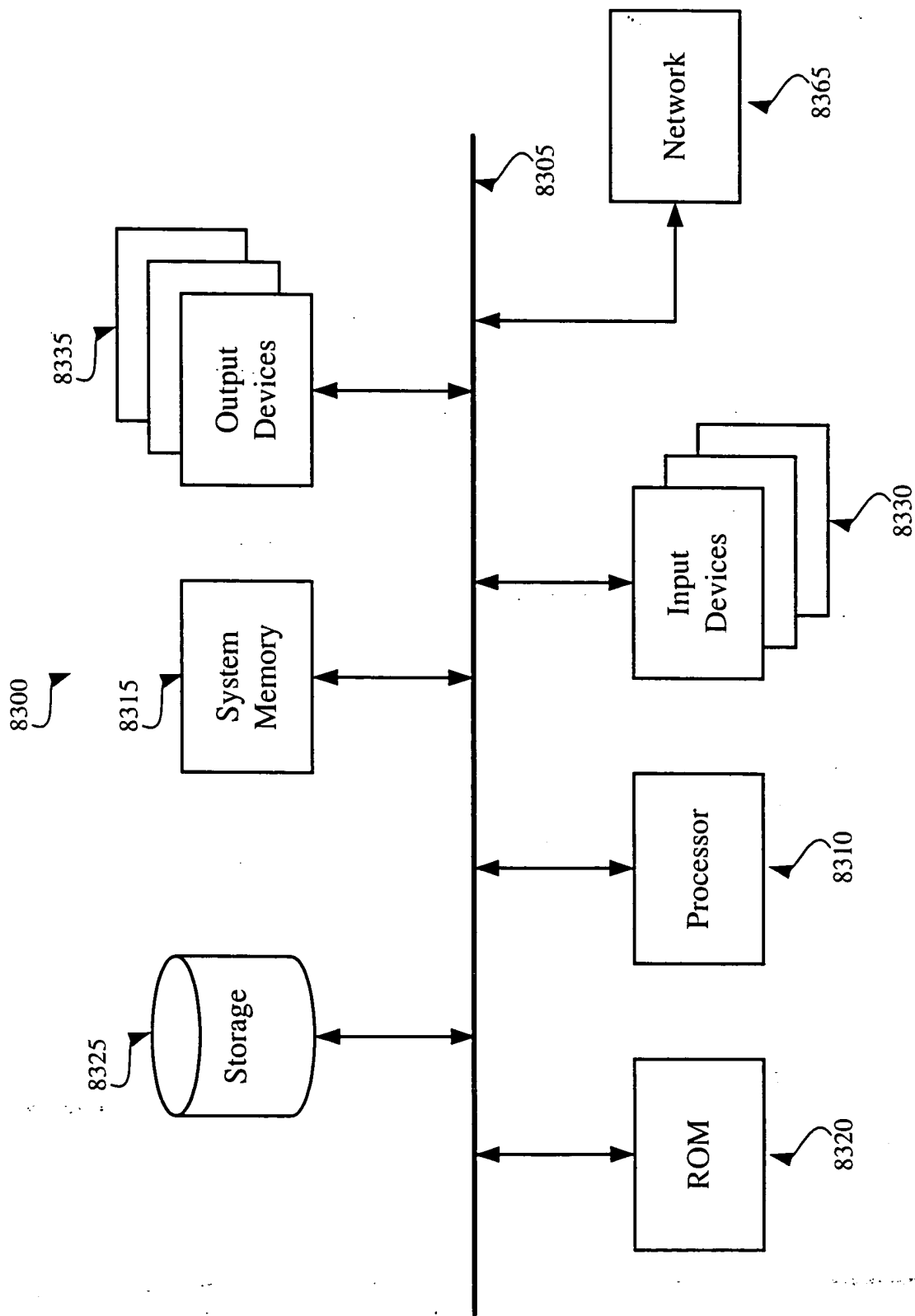


Figure 83